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US Army Corps of Engineers

HYDRAULICS LABORATORY

TECHNICAL REPORT HL-82-15

THE ATCHAFALAYA RIVER DELTA

Report 2
FIELD DATA
SECTION 4: TERREBONNE MARSHES PROGRAM DESCRIPTION AND DATA

by

Howard A. Benson, Barbara P. Donnell

Hydraulics Laboratory

DEPARTMENT OF THE ARMY
Waterways Experiment Station, Corps of Engineers
3909 Halls Ferry Road, Vicksburg, Mississippi 39180-6199

August 1990
Report 2 of a Series

Prepared for US Army Engineer District, New Orleans
New Orleans, Louisiana 70160-0267

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Unclassified
SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

Form Approved OMB No. 0704-0188

1a. REPORT SECURITY CLASSIFICATION Unclassified	1b. RESTRICTIVE MARKINGS
2a. SECURITY CLASSIFICATION AUTHORITY	3. DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; distribution unlimited
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE	
4. PERFORMING ORGANIZATION REPORT NUMBER(S) Technical Report HL-82-15	5. MONITORING ORGANIZATION REPORT NUMBER(S)
6a. NAME OF PERFORMING ORGANIZATION USAEWES Hydraulics Laboratory 6b. OFFICE SYMBOL (If applicable) CEWES-HE	7a. NAME OF MONITORING ORGANIZATION
6c. ADDRESS (City, State, and ZIP Code) 3909 Halls Ferry Road Vicksburg, MS 39180-6199	7b. ADDRESS (City, State, and ZIP Code)
8a. NAME OF FUNDING/SPONSORING ORGANIZATION USAED, New Orleans 8b. OFFICE SYMBOL (If applicable) CELMN-ED	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER
8c. ADDRESS (City, State, and ZIP Code) PO Box 60267 New Orleans, LA 70160-0267	10. SOURCE OF FUNDING NUMBERS PROGRAM ELEMENT NO. / PROJECT NO. / TASK NO. / WORK UNIT ACCESSION NO.

11. TITLE (Include Security Classification)
The Atchafalaya River Delta: Report 2, Field Data; Section 4: Terrebonne Marshes Program Description and Data

12. PERSONAL AUTHOR(S)
Benson, Howard A.; and Donnell, Barbara P.

13a. TYPE OF REPORT	13b. TIME COVERED	14. DATE OF REPORT (Year, Month, Day)	15. PAGE COUNT
Report 2 of a series	FROM _____ TO _____	August 1990	78

16. SUPPLEMENTARY NOTATION
Available from National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.

17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
FIELD	GROUP	SUB-GROUP	Atchafalaya River Delta, LA; Prototype data acquisition; Avoca Island Levee; Terrebonne Marsh, LA; Numerical model predictions

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

The Wax Lake Outlet and Lower Atchafalaya River deltas in Louisiana have grown dramatically. Concern for the impact of this growth has led the US Army Corps of Engineers to conduct an investigation to predict how the deltas will evolve over the next 50 years and to determine the impacts of that growth on navigation, flood control, salinity, and sedimentation. Within this series of reports, this section documents the data collected for use in development and verification of numerical models to predict the effects of the Avoca Island Extension and delta evolution on circulation, sediment supply, and salinity in the western Terrebonne marshes. This report presents representative results of the data collection program in this area from 1983 to 1986 and describes the equipment and procedures used in the data acquisition.

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20. DISTRIBUTION/AVAILABILITY OF ABSTRACT	21. ABSTRACT SECURITY CLASSIFICATION
☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT. ☐ DTIC USERS	Unclassified
22a. NAME OF RESPONSIBLE INDIVIDUAL	22b. TELEPHONE (Include Area Code) / 22c. OFFICE SYMBOL

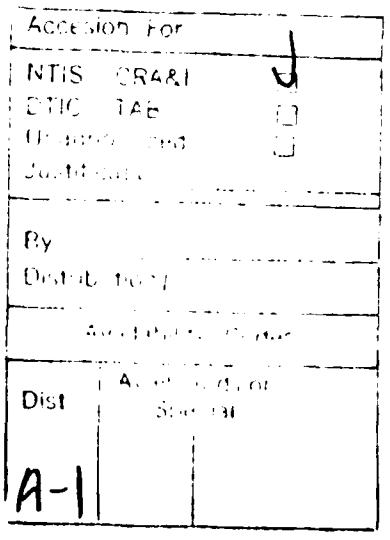
DD Form 1473, JUN 86 Previous editions are obsolete. SECURITY CLASSIFICATION OF THIS PAGE
Unclassified

PREFACE

The work described in this report was performed by the Hydraulics Laboratory (HL) of the US Army Engineer Waterways Experiment Station (WES) during June 1983 through February 1986 as a part of the overall Atchafalaya Bay Investigation. The work for the Terrebonne Marsh Study was authorized by the US Army Engineer District, New Orleans (LMN), in May 1983, and managed by Mr. Bill Garrett and Ms. Nancy Powell, LMN.

HL personnel performed this work under the direction of Messrs. H. B. Simmons, former Chief, HL; F. A. Herrmann, Jr., Chief, HL; R. A. Sager, Assistant Chief, HL; W. H. McAnally, Jr., Chief, Estuaries Division (ED), HL; George M. Fisackerly, Chief, Estuarine Processes Branch (EPB), ED; and R. A. Boland, Jr., former Chief, Hydrodynamics Branch. The project study was managed by Ms. B. P. Donnell, Estuarine Simulation Branch (ESB), with technical guidance given by Mr. J. V. Letter, Jr., Chief, ESB. The field data collection program was designed by Messrs. Fisackerly, A. M. Teeter, EPB, and D. A. Crouse (retired) and executed under the direction of Messrs. Fisackerly, Crouse, H. A. Benson, and J. W. Parman, all of EPB. Other WES personnel participating in the data collection effort were Messrs. S. E. Varnell, J. T. Hilbun, B. G. Moore, D. M. White, and L. G. Caviness. LMN personnel providing assistance in the data collection effort were Messrs. E. LeBlanc and N. Ourso. This report was prepared by Mr. Benson and Ms. Donnell with assistance by Ms. C. J. Coleman and Mr. W. C. LaHatte, both of EPB.

Commander and Director of WES during preparation of this report was COL Larry B. Fulton, EN. Technical Director was Dr. Robert W. Whalin.



CONTENTS

CONVERSION FACTORS, NON-SI TO SI (METRIC) UNITS OF MEASUREMENT

Non-SI units of measurement used in this report can be converted to SI (metric) units as follows:

Multiply	By	To Obtain
cubic feet	0.02831685	cubic metres
Fahrenheit degrees	*	Celsius degrees
feet	0.3048	metres
inches	2.540	centimetres
microns	0.001	millimetres
miles (U. S. statute)	1.609344	kilometres
ounces (mass)	28.34952	grams
pounds (mass)	0.4535924	kilograms
tons (2,000 pounds, mass)	907.1847	kilograms

* To obtain Celsius (C) temperature readings from Fahrenheit (F) readings, use the following formula: $C = (5/9)(F - 32)$. To obtain Kelvin (K) readings, use: $K = (5/9)(F - 32) + 273.15$.

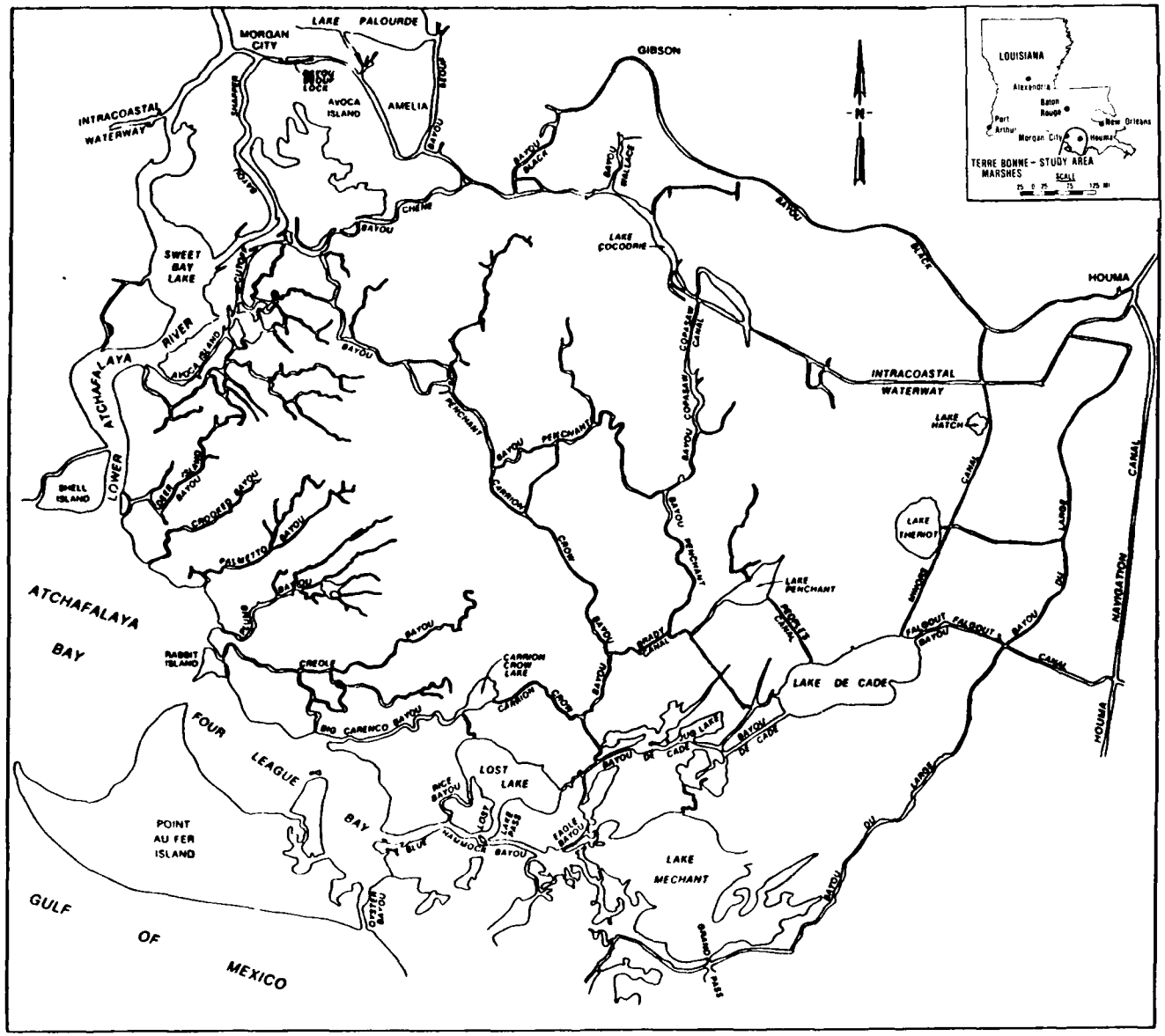


Figure 1. Terrebonne marsh study area

THE ATCHAFALAYA RIVER DELTA

FIELD DATA

Section 4. Terrebonne Marshes Program Description and Data

PART I: INTRODUCTION

Background

1. The Terrebonne Marshes are located east of the lower Atchafalaya River between Morgan City, LA, and the Gulf of Mexico. The study area (Figure 1) is bounded by Bayou Black on the north, the Lower Atchafalaya River on the west, the Gulf of Mexico to the south, and Bayou du Large on the east. The area is approximately 1200 square miles and rich in natural resources: oil, gas, fish, shrimp, oysters, fowl, and fur-bearing wildlife. The area is composed mostly of low-lying marsh, winding channels, man-made canals, lakes, and shallow embayments. The significant navigable waters in the area are the Lower Atchafalaya River and Bay channel, the Gulf Intracoastal Waterway, Bayou Penchant, and Bayou Chene.

2. The system is greatly affected by the Atchafalaya River, which carries an average of about 100 million tons* of sediment each year. This material has progressively filled in the Atchafalaya basin floodway between its natural levee systems over the past several decades and is now depositing rapidly in the Atchafalaya Bay. These sediment-laden waters of the Atchafalaya River can reach Terrebonne marsh by going around the southern tip of the existing Avoca Island Levee or going through Bayou Beouf Lock (Figure 2). The gates of the 75-foot-wide lock are closed when the difference between the west gage and the east gage exceeds a half of a foot. Although flow is predominately west to east, there are recorded instances of reverse flow.

3. Despite delta evolution, the Louisiana coastal region is experiencing about a 50-square-mile land loss annually. Contributing factors are natural sea level rise, subsidence, a decrease in the total sediment load in the Mississippi-Atchafalaya Rivers system, and human activities. Salinity

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* A table of factors for converting non-SI units of measurement to SI (metric) units is presented on page 3.

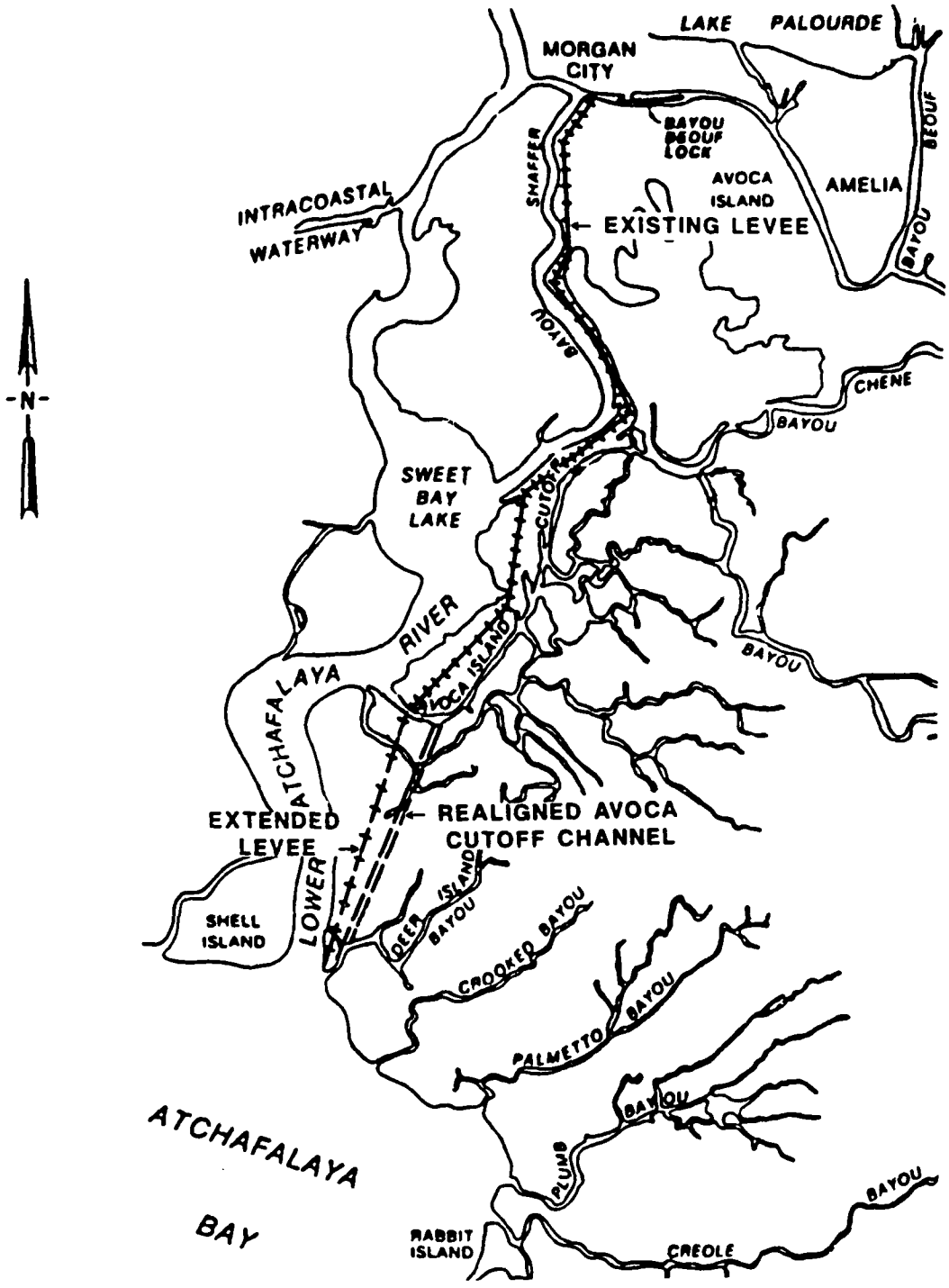

Figure 2. Levee extension plan

intrusion is a major concern with regard to the preservation of the marsh habitat.

4. In the early 1950's, a 13-mile Avoca Island Levee was built south of Morgan City to protect the area east of the city from backwater flooding. Active delta growth in the Atchafalaya Bay has resulted in the elongation of the river's course causing a rise in the water elevation at the end of the levee. In 1981, the US Army Corps of Engineers proposed a 14,000-foot levee extension from Avoca Island Cutoff to Deer Island (Figure 2) to continue backwater flood protection east of the floodway. The extension would include a provision to divert freshwater to maintain the present distribution of non-flood flows (which is estimated to be about 4000 cfs) from the Atchafalaya River to the Terrebonne Marshes. The structure(s) would necessarily be closed when the stage at Amelia, LA, reached 3 feet to provide an acceptable level of damage reduction from Lower Atchafalaya River backwater flooding.

5. The U. S. Army Engineer District, New Orleans (LMN), requested the Estuaries Division, Hydraulics Laboratory, of the Waterways Experiment Station to model the Terrebonne marsh area and to provide information on levee length and height needed for flood control, and on sediment and water supply to the marshes from the Atchafalaya River.

Purpose

6. The Terrebonne Marsh Study was an adjunct to the Atchafalaya Bay Investigation. The purpose of the overall study was to predict the effects of the Avoca Island Extension and delta evolution on circulation, sediment supply, and salinity in the western Terrebonne marshes. The purpose of the field data collection program was to provide the necessary field data needed for the numerical modeling prediction efforts.

Scope

7. This report presents representative results of a field data collection program in the Terrebonne Marshes area during June 1983 through February 1986. This program was performed by the Estuaries Division, Hydraulics Laboratory of the US Army Engineer Waterways Experiment Station (CEWES-HE). This report will provide a permanent record of the instrumentation and techniques employed and make the data available for future use.

PART II: DATA COLLECTION PROGRAM

8. Data were collected in the Terrebonne Marshes area from June 1983, at the end of the Atchafalaya Bay data collection program, until February 1986. During this time, 10 recording tide gages were installed and 10 recording current meters were deployed at strategic locations (Figure 3) throughout the marshes and bayous. During bi-monthly or monthly service trips, discharge measurements were collected at 7 ranges (Figure 4), and water samples were collected at 14 locations (Figure 5).

9. The long-term tide and velocity information was used in verification of the hydrodynamic model. The water samples provided salinity and suspended sediment information used primarily in the salinity intrusion study. The discharge range data were used to establish the geometry and to provide velocity boundary conditions for Lake Palourde in the numerical model computational mesh. Upstream discharge data were obtained from the New Orleans District.

Equipment and Methods

Tidal elevations

10. Tidal elevations were measured by a system consisting of a stilling well-contained float that is connected by a wire rope to a recording device. The tide gages were Fischer and Porter Company Type 1550 punched tape level recorders (Photo 1). The gages record elevations to the nearest 0.01 ft and have a range of 100 ft. The units are powered by a 7.5-volt battery. A timer activates the recording mechanism every 15 minutes, and the float elevation at that time is punched on 16-channel, foil-backed paper tape. The float is a 3-inch-diameter aluminum cylinder, and the stilling well is a 4-inch-diameter plastic pipe. Water in the stilling well responds to water levels outside the well by flow through a 15-ft-long, 3/8-inch-diameter copper tube. The tube's outer end is protected against clogging by a cylindrical copper filter.

11. Vertical control for the tide gage assemblies was arbitrary. The 15-ft-long tube used as the stilling well port was designed to minimize short-period oscillations and to cause the well to respond linearly to fluctuations in the outside water level. Response characteristics of the tide wells have

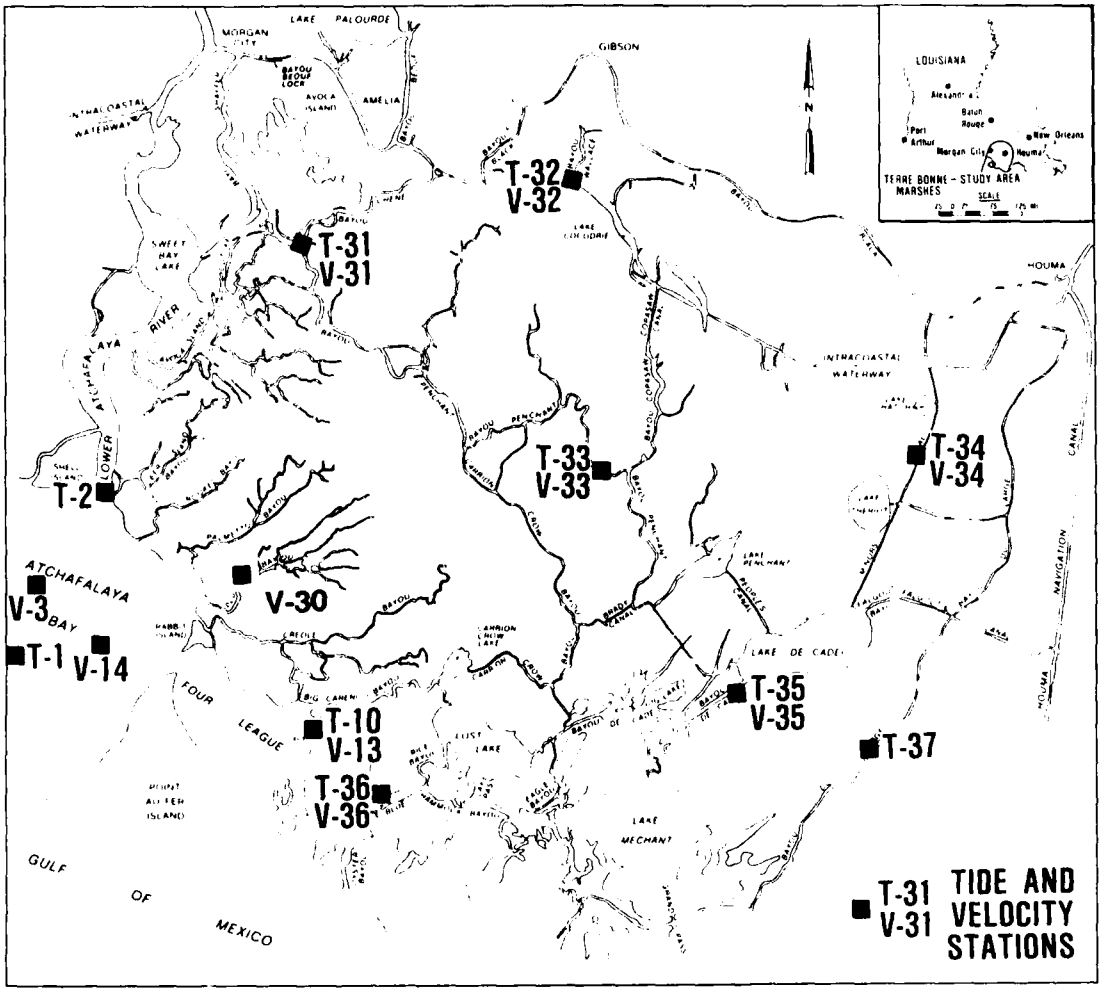

Figure 3. Location of tide gages and current meters

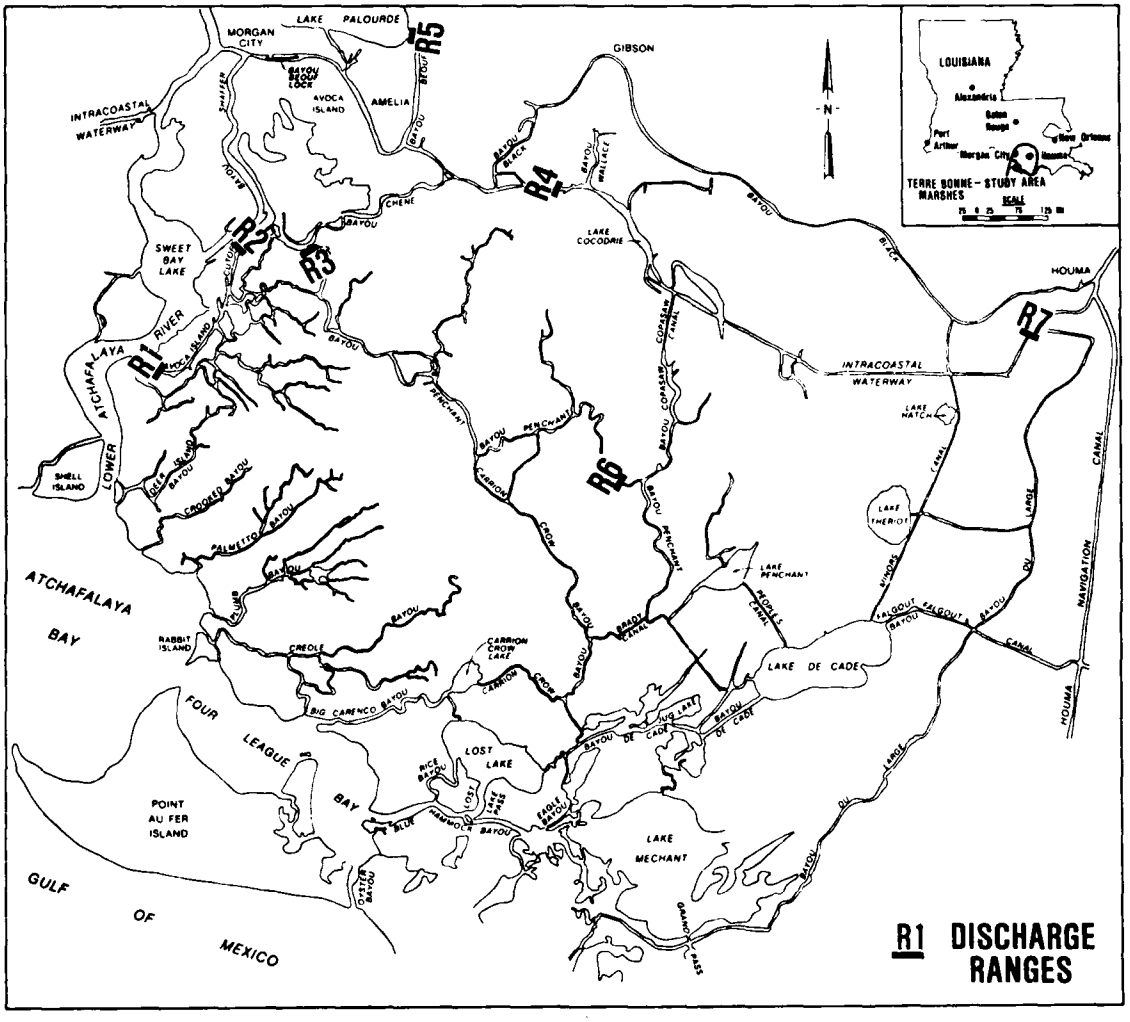

Figure 4. Location of discharge ranges

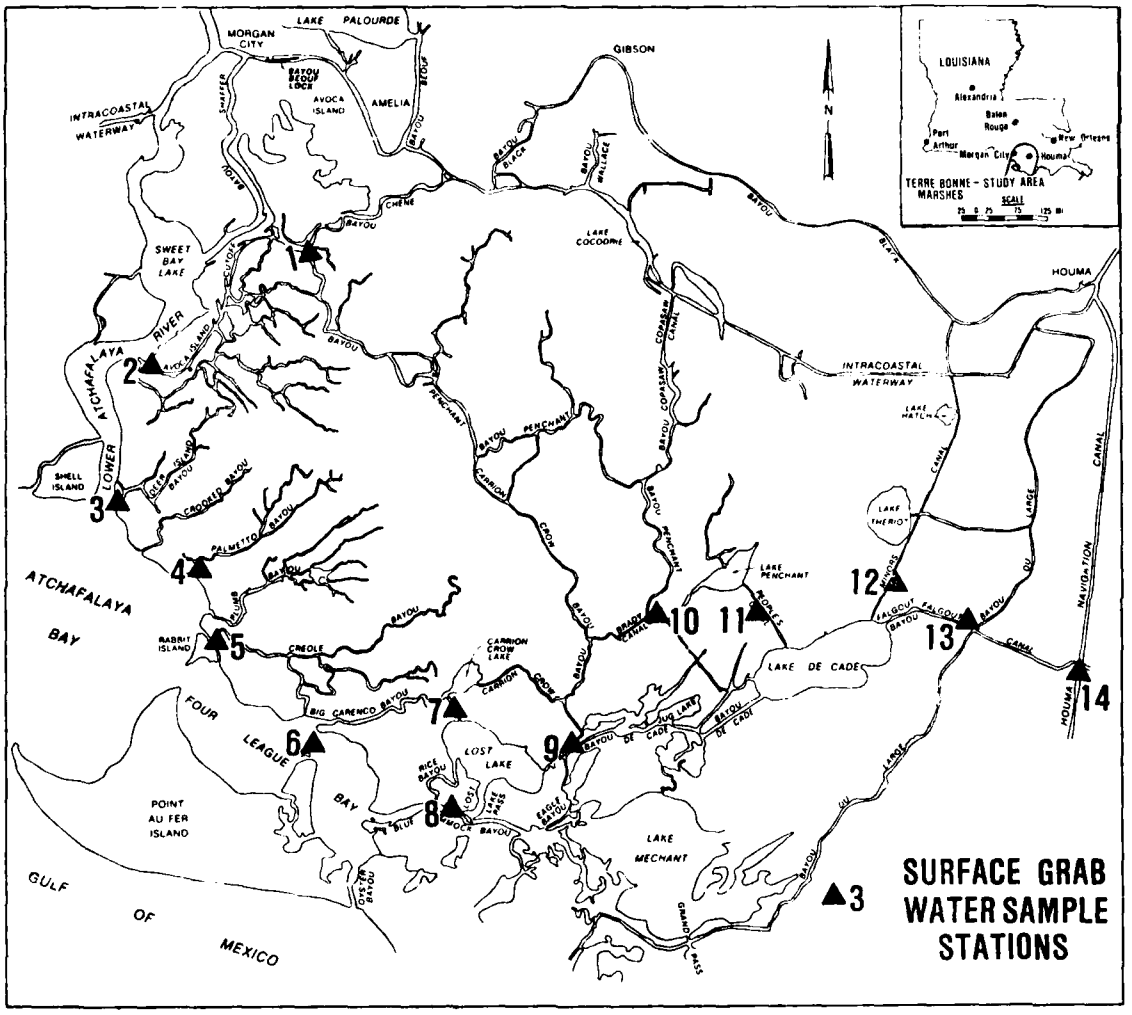

Figure 5. Location of sampling stations

been determined by drainage tests.* Figure 6 shows the derived amplitude and phase response characteristics of the tide wells. It can be seen that amplitude decreases sharply for periods less than 50 min and is less than 10 percent for periods under 1 min. The half-amplitude period is 9 min. The amplitude response is essentially unity and phase lag approaches zero at tidal periods.

12. Initial synchronization of the tide recorder timer is within ±5 sec of the National Bureau of Standards (NBS) time standard. Bench tests of the timers have shown them to exhibit negligible error in time for individual readings over a 1-hr period. Gage time is generally accurate to ±2 min per month, except for occasional malfunctions that can cause larger time errors. In practice, gage and NBS times are recorded when tapes are removed so that timing errors can be identified. Relative accuracy is affected by temperature of the water, float, and wire, plus salinity changes of the water inside the well. Relative accuracy is considered to be within 0.1 ft.

Over-the-side equipment

13. The equipment used to obtain discrete samples from a boat consists of a current meter, direction indicator, and weight (fish), all suspended by a wire rope, plus remote readout devices and a support frame. The assembly (Photo 2) is mounted on a boat that moves from station to station collecting data. The current meter is a vertical-axis, cup-type meter (Gurley Model 665) with a remote, direct-reading speed indicator. The direction indicator consists of a remote-reading magnesyn compass mounted just above the current meter in a waterproof cylindrical housing. Suspended below the meter is a finned, streamlined weight (fish) that holds the sensors in a vertical attitude facing into the flow. The sensor assembly is supported by a 1/8-in wire rope from a portable support frame that is equipped with a winch to raise and lower the assembly. An indicator on the winch shows the sensor's depth below the water's surface. Water samples are taken at the depth of measurement by pumping through a 3/8-in plastic tube whose tip is mounted just below the current meter and pointed into the flow. A small pump on board the boat pumps the water through a bimetal thermometer and into sample bottles.

14. The Gurley current meters have been found to have a threshold speed

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* W. H. McAnally, Jr. 1979. "Water Level Measuring by Estuaries Division, Hydraulics Laboratory," Memorandum for Record, US Army Engineer Waterways Experiment Station, Vicksburg, Ms.

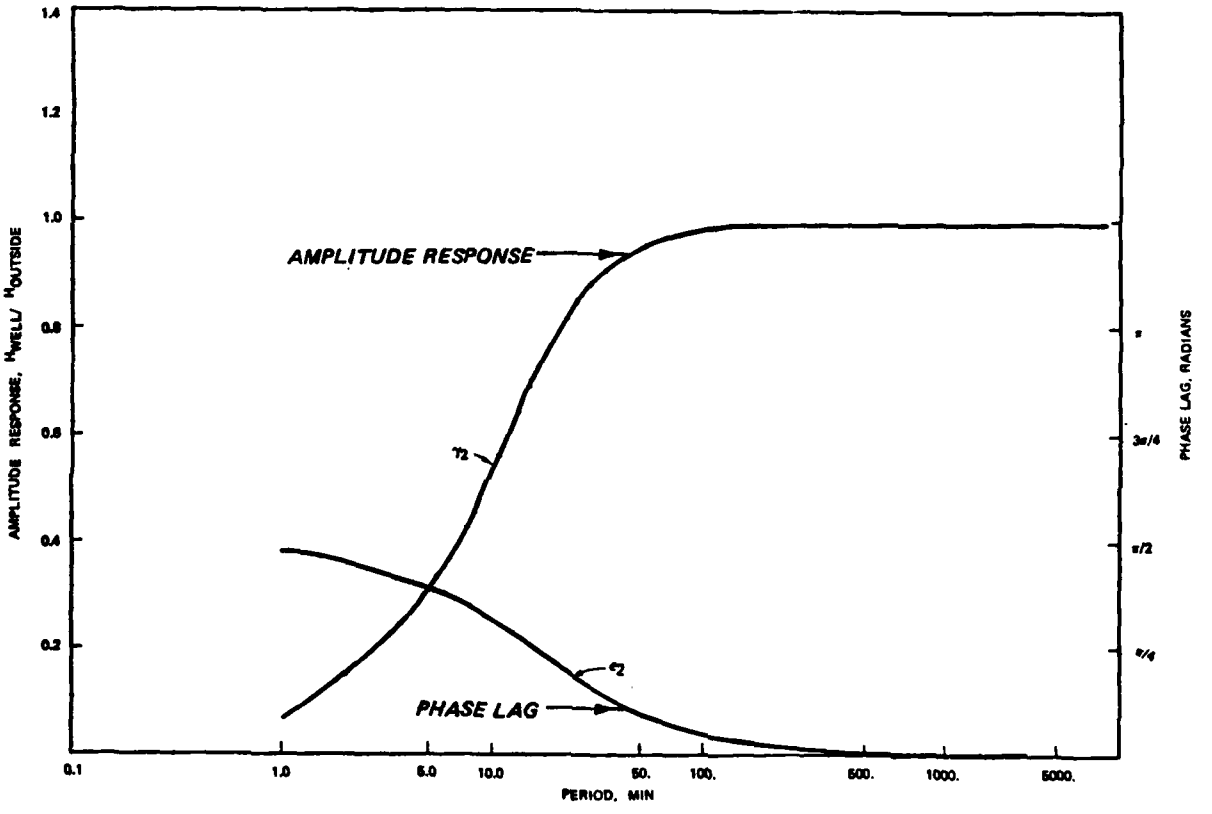

Figure 6. Response characteristics of Standard Tide Well Port used by CEWES-HE

of less than 0.2 fps and at 75°F to give the correct current speed to within +3 to -5 percent for speeds of 1 to 7 fps, and ±0.1 fps for speeds less than 1 fps.* Error due to temperature change is approximately 0.05 percent per degree Fahrenheit deviation from 75°F. At flow speeds greater than 3 fps, readings near the surface tend to be somewhat low due to sensor inclination. Accuracy of the direction indicator is within 10 degrees at speeds greater than 0.5 fps, but strong wave action moving the boat can cause temporary errors greater than this. Accuracy of the in-line thermometer is approximately ±2°F.

Sample analysis

15. Water samples to be used for salinity and suspended sediment measurements were placed in 8-oz plastic bottles. Salinities of discrete water samples were measured in the laboratory, using a Beckman Model RA5 salinometer with automatic temperature compensation. The salinometer was calibrated with Standard Sea Water and was accurate to within ±0.2 ppt. Total suspended materials (TSM) were determined by filtration of samples. Nuclepore polycarbonate filters with 0.40 micron pore size were used. They were desiccated and preweighed, then a vacuum system (8-lb vacuum maximum) was used to draw the sample through the filter. The filters and holders were then washed with distilled water. The filters were dried at 105°C for 1 hr and then reweighed. TSM was then calculated based on the net weight retained on the filter and the volume of the filtered sample.

Recording current meters

16. The self-contained recording current meters used for longer term measurements were Environmental Devices Corporation (ENDECO) Type 174 meters. The meter (Photo 3) floats horizontally at the end of a tether, measuring current speed with ducted impeller and current direction with an internal compass. The ENDECO 174 also measures temperature with a thermilinear thermistor and conductivity with an induction type probe. Data are recorded on cartridge-loaded, endless loop, magnetic tape. Threshold speed is less than 0.08 fps, maximum speed of the unit used was 8.44 fps, and stated speed accuracy was ±3 percent of full scale. The manufacturer states that direction accuracy is ±7.2 deg above 0.08 fps. Time accuracy is ±4 sec per day. A

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* W. H. McAnally, Jr. 1978. "Calibration Check of Harbor Entrance Branch Prototype Current Measurement Equipment," Memorandum for Record, US Army Engineer Waterways Experiment Station, Vicksburg, Ms.

typical tethering arrangement is shown in Figure 7.

17. The current meters used were designed to be used in an oceanic environment - large water depth, high salinity, and low suspended sediment concentration. However, the environment in which we deployed them was different from the ocean environment, in some cases radically, so adjustments were made by the manufacturer yielding the ability to monitor salinities (conductivities) full range, 0-35 ppt.

18. Depths as shallow as 6 feet were not unusual. Velocities varied from null (slack) to multiple feet per second. Suspended sediment content in the entire water column was very high relative to that found in the open ocean. Should the meter's neutral buoyancy be disturbed or the meter forced into contact with the bottom, measurement errors will occur and eventual if not immediate damage will be incurred by the bearings, directly affecting the meter. Likewise, the temperature and conductivity sensors can be affected. The abrasive quality of the suspended sediment damages the bearings much more quickly than does the design waters even if no contact with the bed occurs.

19. Weather conditions in the Terrebonne Marshes (e.g., fog, wind, or storms) sometimes prevented scheduled trips to service deployed meters and to retrieve data. When servicing was delayed, loss of battery power and meter malfunction caused loss of data at some locations.

20. We knew at the initiation of the data collection program that the harsh conditions encountered would limit the data return rate. Therefore, we did not expect nor did we get the percentage of target data that we would have expected to obtain under more nearly ideal conditions.

Data Collected

Tidal elevations

21. Tidal elevations were measured at 10 locations shown in Figure 3. Table 1 shows the list of available data collected and the percent of data retrieval for each station during the data collection program. Elevations were recorded at 15-min intervals at all locations. Table 2 lists hourly water surface elevations for a randomly chosen one week period. The gages were serviced and tapes changed approximately every month depending on weather conditions.

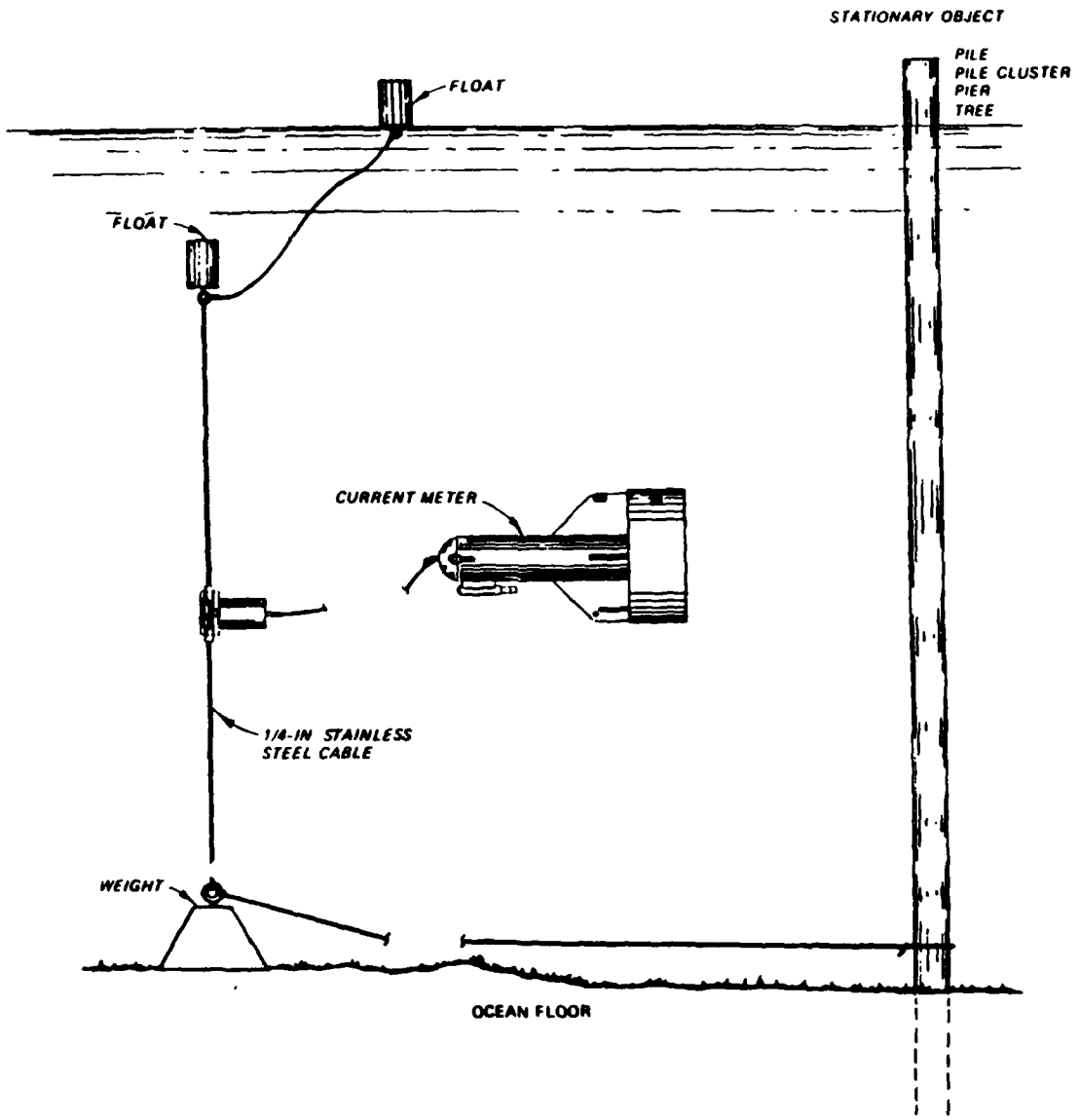

Figure 7. Typical current meter deployment

Recording current meters

22. Recording current meters (ENDECO 174's) measured current speed, current direction, conductivity, and temperature at the 10 locations shown in Figure 3. Table 3 lists the available data for each station along with the percent of data retrieval for each measured parameter during the data collection program. The current meters were set to record at 2-min intervals. Table 2 lists hourly readings for current speed, current direction, temperature, and conductivity for a randomly chosen 1-week period. The meters were cleaned, serviced, and tapes replaced approximately every month depending on weather conditions.

Discharge measurements

23. Velocities were measured at 7 locations shown in Figure 4 in order to calculate the discharge. At ranges 1, 2, 3, 5, and 6, measurements were collected at the centerline and quarter-points of the channel. At ranges 4 and 7 measurements were collected at the centerline, quarter-points, and eighth-points. Table 4 lists the dates that the discharge measurements were collected. Discharge measurements for Range 7, the Intracoastal Waterway, are presented in Table 5. Tables 6-12 list the composite velocity, suspended sediment, and salinity measurements for ranges 1-7, respectively. Measurements were collected at 0.2, 0.6, and 0.8 of the overall depth. As weather permitted, the data were collected approximately every 2 weeks.

Salinity and suspended material samples

24. Surface-grab (SG) water samples were collected, for salinity and suspended sediment determinations, at the 14 locations shown in Figure 5 and at Ranges 2 and 4-7 in Figure 4. SG stations 1 and 2 coincide with Ranges 3 and 1, respectively. The samples were collected at surface and mid-depth for the SG stations and at 0.2, 0.6, and 0.8 of the overall depth at the range locations. Table 4 lists the dates the samples were collected. A representative sample of total suspended sediment and salinity data are presented in Table 13. Tables 6-12 list the salinity and suspended sediment measurements at the seven range locations. Tables 14-25 list the salinity and suspended sediment measurements for SG stations 3-14, respectively. Table 26 lists salinity and suspended sediment measurements at stations in Oyster Bayou, Plumb Bayou, and Bayou DuLarge.

PART III: THE DATA

25. The data described here are presented in several different formats. Due to the magnitude of data collected for the Terrebonne Marshes Project, only summary tables, composite tables, and sample plots are shown.

26. A sample of a tidal plot is presented as Figure 8. Hourly water surface elevations from station T-31 are shown for the period from 24-31 July, 1984. Table 2 lists the hourly readings (ft) for this time period. The gage datum is arbitrary since no vertical control has been established in the area. Analyses have been used to establish approximate datum planes. The 207 files of tidal data, collected from June 1983 through February 1986, are stored in ASCII format on 1600 bpi density magnetic tapes at CEWES-HE. The same tidal data are also stored on 6250 bpi density magnetic tapes at LMN.

27. A sample of the data collected from the recording current meters is presented as Figures 9-12. Hourly data from station V-31, for the period 24-31 July, 1984, are shown in plots of current speed, current direction, water temperature, and conductivity, respectively. The conductivity readings for this period are all 5 millimhos/cm, which is the lowest possible conductivity reading the current meter records. This plots as a straight line as shown in Figure 12. Table 2 lists the hourly data for current speed (fps), current direction (deg), conductivity (mmhos/cm), and temperature (deg°C) for this period. The 126 files of current meter data, collected from June 1983 through February 1986, are stored at CEWES-HE and at LMN in forms given above.

28. A sample of the discharge measurements is presented in Table 5. The range number, location, date, sampling time, distance across the range, overall depth, sample depth, current direction, and current speed are shown in the table. Tables 6-12 are a composite of the velocity, salinity, and suspended sediment data collected on ranges 1-7. The tables list the date and time of the measurement, the overall depth, the direction the current was flowing, maximum and minimum velocities, and the salinity and suspended sediment measurements at the surface and middepth. The discharge measurement data (original data sheets), collected for 50 sampling periods from June 1983 through February 1986, are on file at CEWES-HE.

29. A sample of the total suspended material and salinity data is presented in Table 13 and in Tables 14-26. The sample collection date, station number, depth and time of sampling, sediment concentration, and salinity value

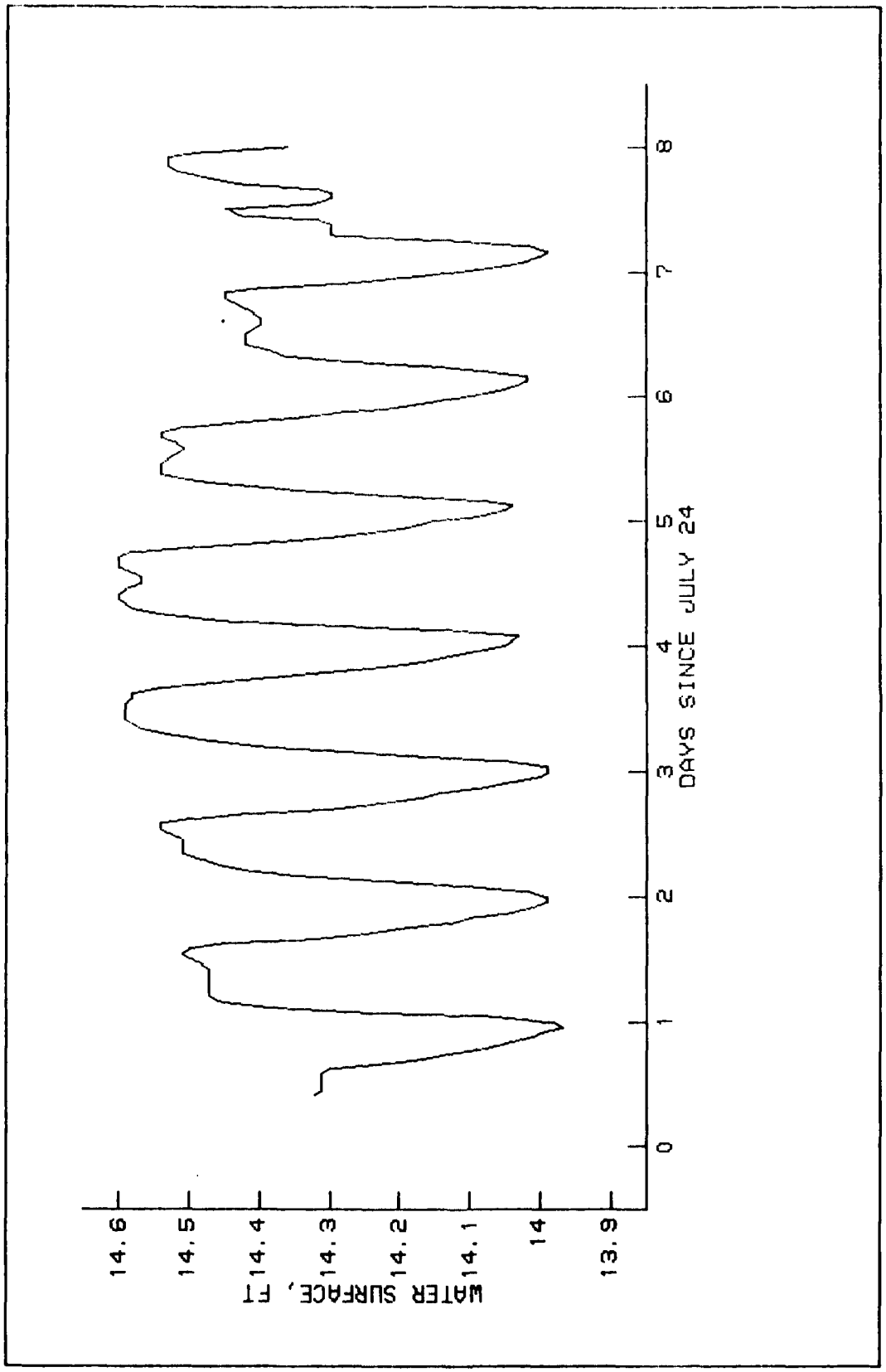

Figure 8. Water-surface elevation at sta T-31, July 24-31, 1984

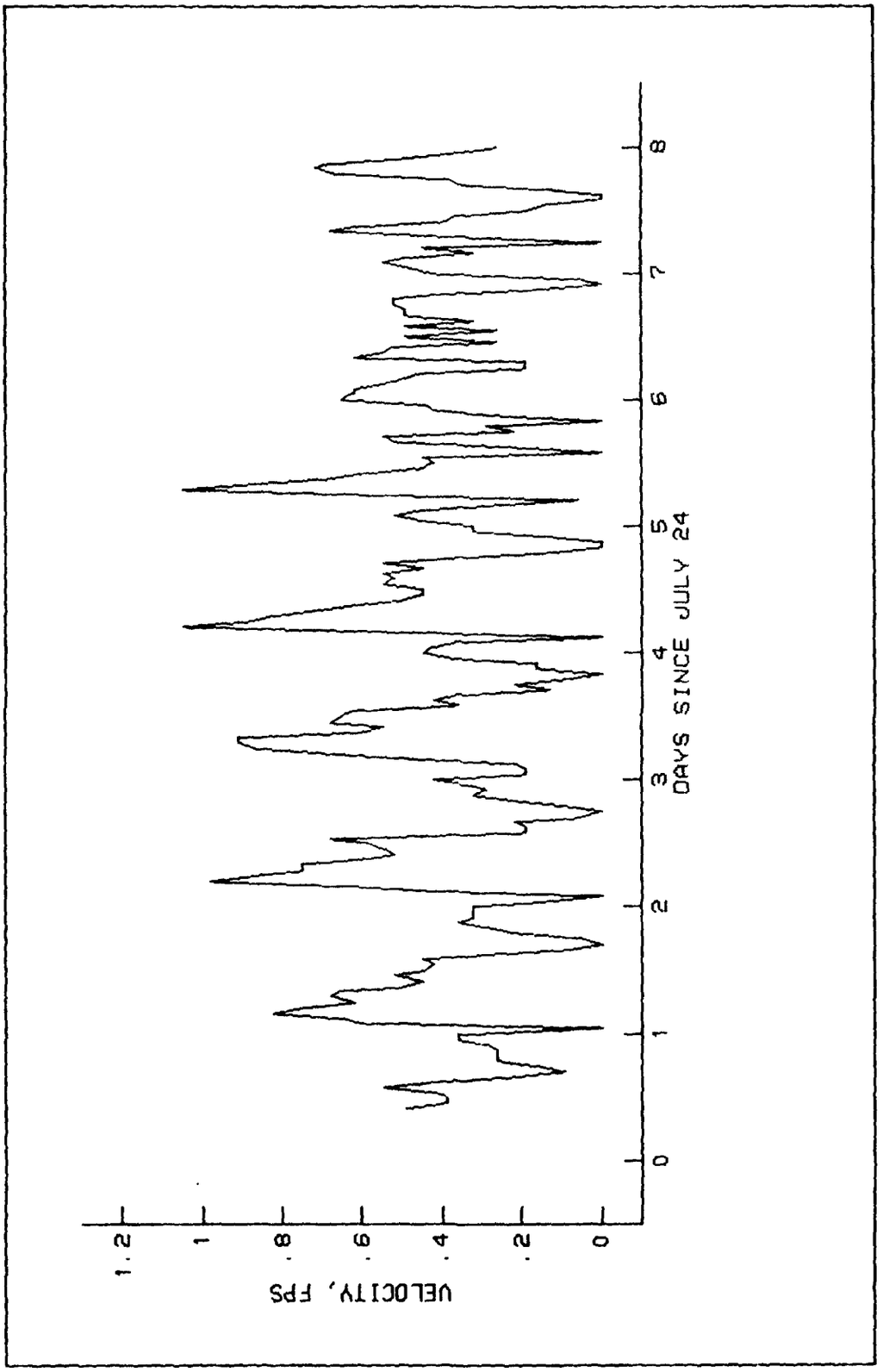

Figure 9. Current velocity at sta V-31, July 24-31, 1984

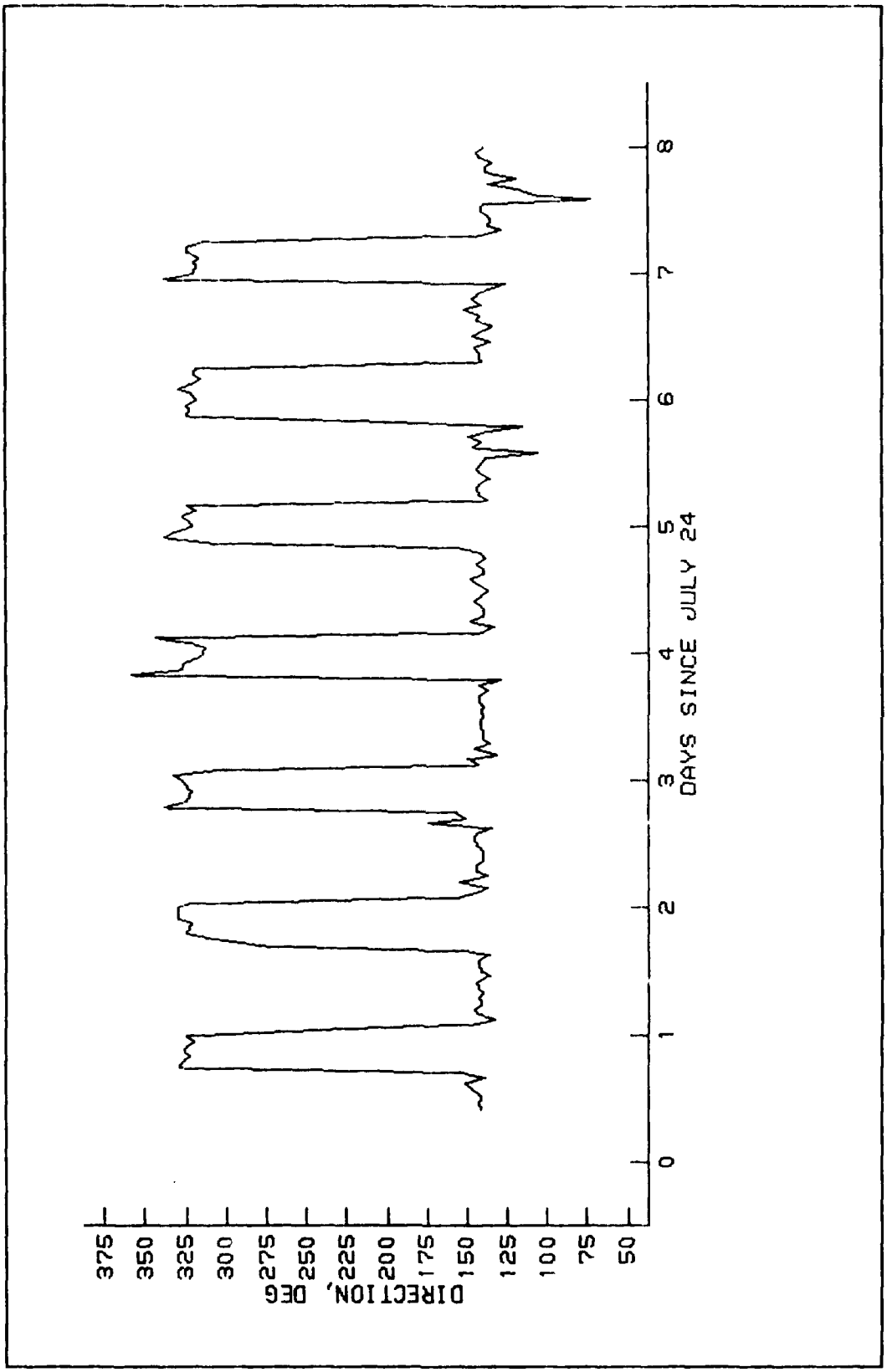

Figure 10. Current direction at sta V-31, July 24-31, 1984

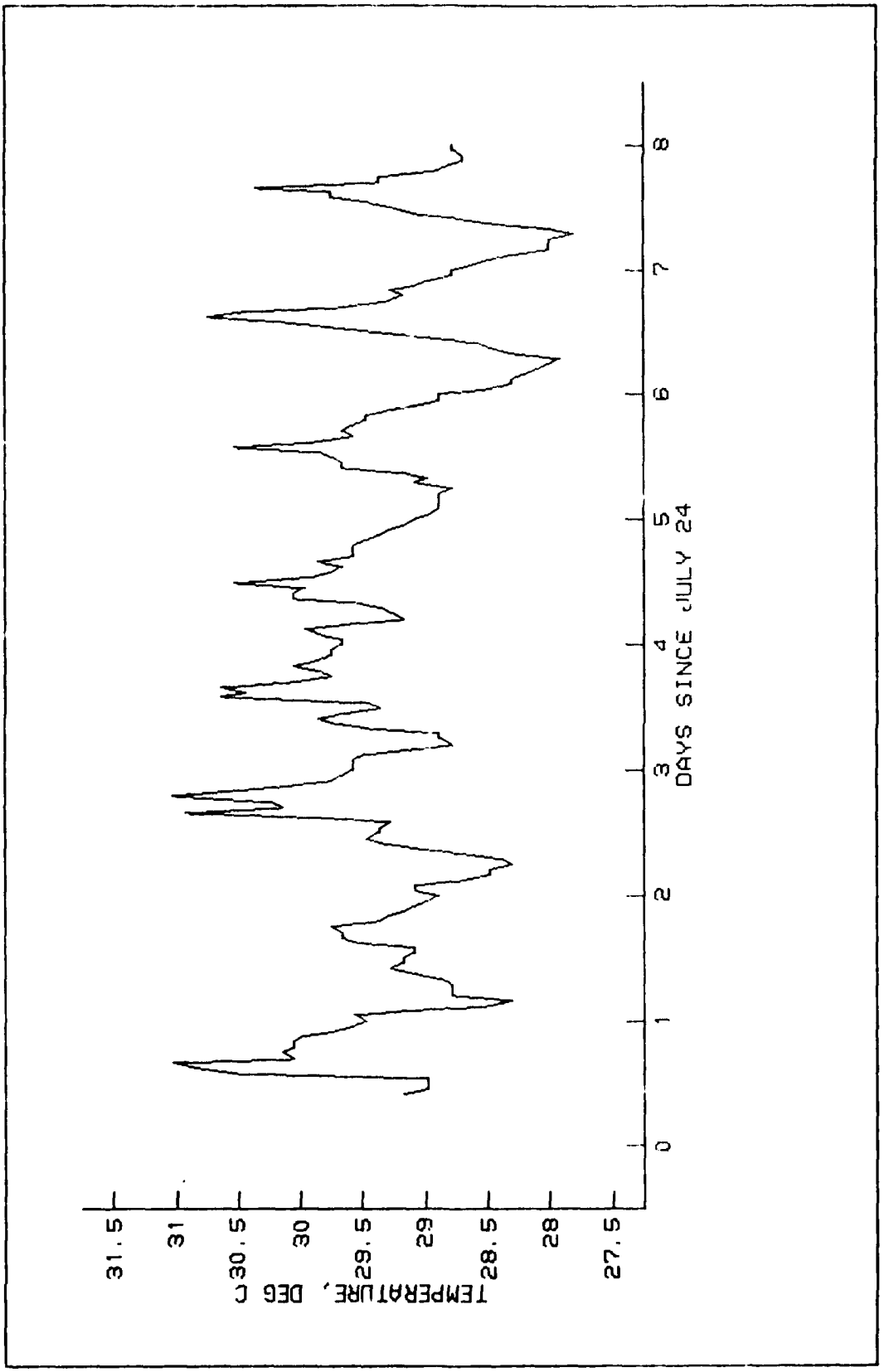

Figure 11. Temperature measurements at sta V-31, July 24-31, 1984

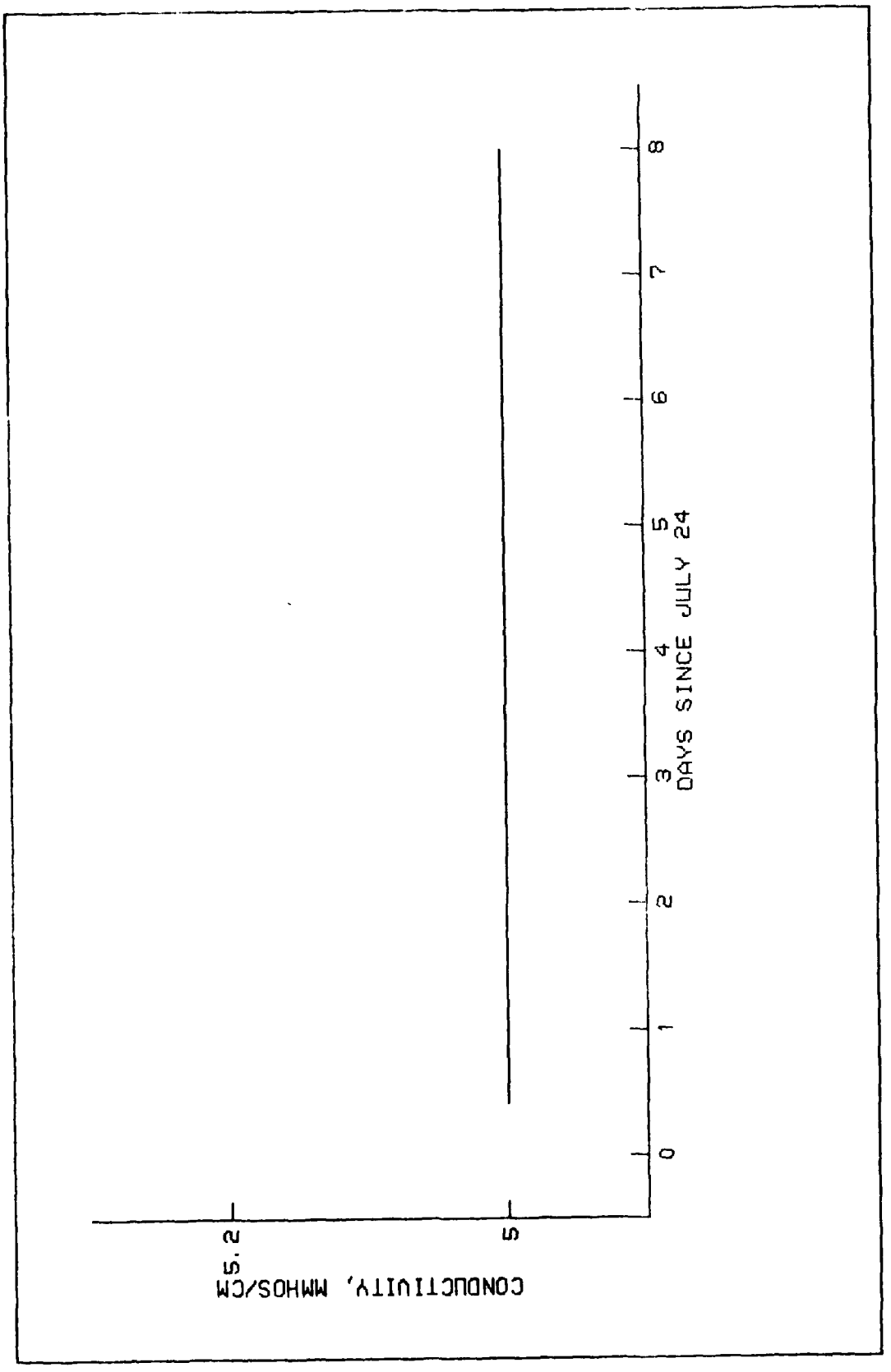

Figure 12. Conductivity measurements at sta V-31, July 24-31, 1984

are shown in the tables. The total suspended material and salinity data (raw data sheets), collected from June 1983 through February 1986, are on file at CEWES-HE.

30. Stages at Simmesport, Louisiana are presented in Figure 13. Conversion of stages to discharges may be accomplished using the rating curve shown in Figure 14. Weather data for the duration of the study may be obtained from the National Weather Service.

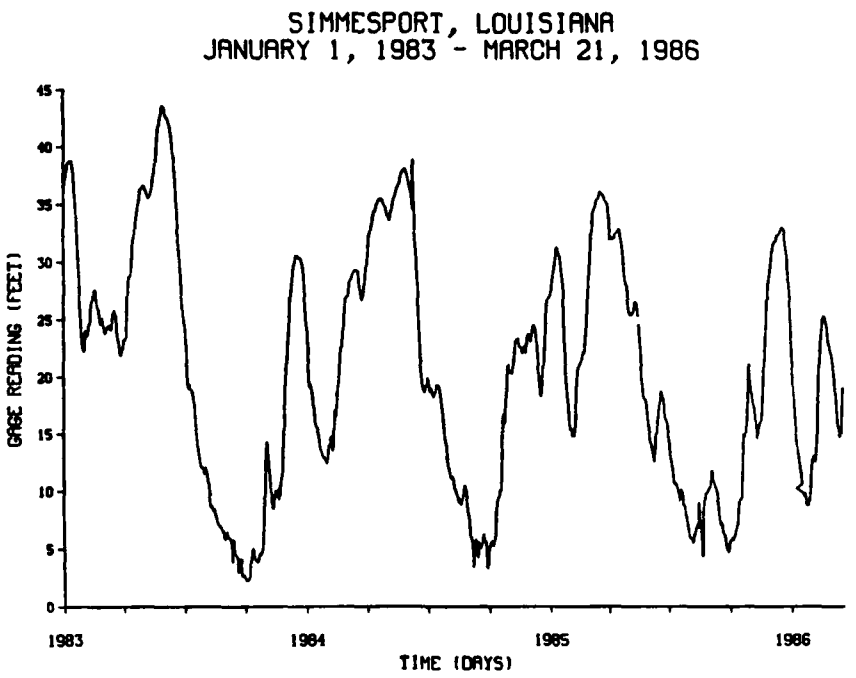

Figure 13. Stages at Simmesport, LA

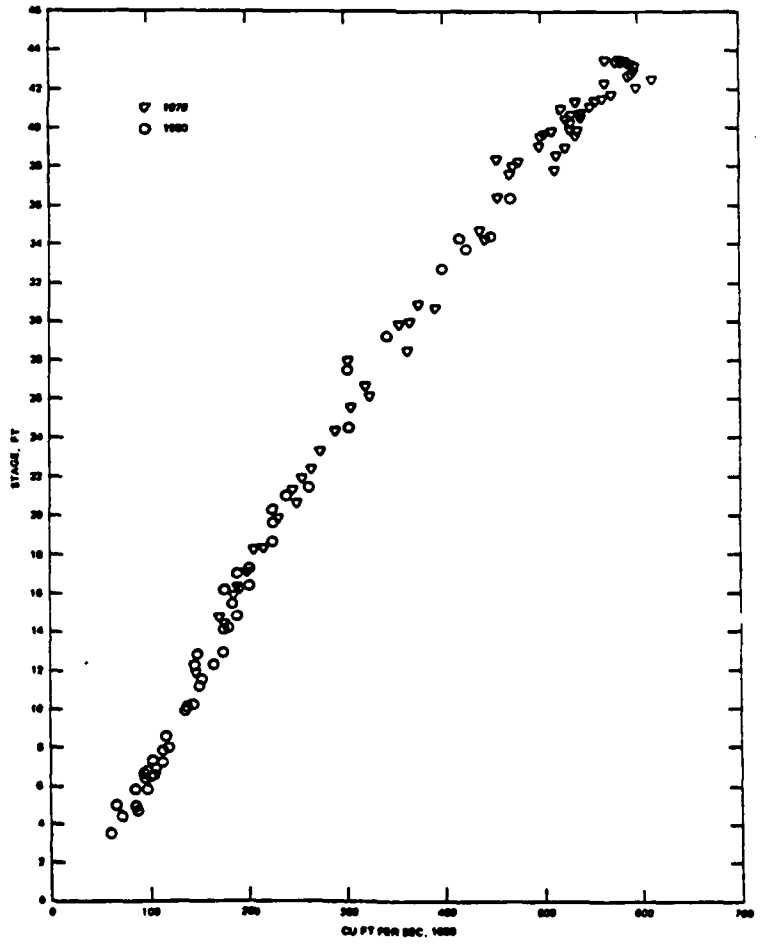

Figure 14. Stage-discharge relationship at Simmesport, LA

PART IV: SUMMARY

31. The data collected as described herein provided essential information to establish the geometry, boundary conditions, and verification data stations for the hydrodynamic, salinity intrusion, and sediment transport numerical modeling prediction efforts.

Table 1

List of Available Tidal Data

Tide Gage No.	Data Periods Beginning Date	Ending Date	Percentage of Data Retrieval	
1	06/21/83	07/20/83	95	
	07/20/83	11/02/83	95	
	11/02/83	11/30/83	95	
	11/30/83	01/26/84	95	
	04/25/84	05/24/84	15	
	05/24/84	06/21/84	100	
	06/21/84	08/09/84	100	
	08/09/84	08/22/84	100	
	08/22/84	10/02/84	100	
	10/02/84	10/18/84	100	
	10/18/84	11/14/84	100	
	11/14/84	12/12/84	80	
	12/12/84	01/09/85	75	
	02/13/85	05/02/85	65	
	05/02/85	06/22/85	90	
	06/22/85	06/28/85	100	
	08/21/85	09/18/85	100	
	09/18/85	11/14/85	100	
	11/14/85	12/03/85	100	
	12/03/85	02/12/86	100	End of station
2	06/22/83	07/20/83	60	
	07/20/83	11/02/83	99	
	11/03/83	01/05/84	100	
	01/05/84	02/01/84	100	
	02/01/84	03/01/84	95	
	03/01/84	03/29/84	100	
	03/29/84	04/25/84	100	
	04/25/84	05/24/84	100	
	05/24/84	06/21/84	99	
	06/21/84	08/09/84	100	
	08/09/84	08/22/84	100	
	08/22/84	10/02/84	95	
	10/02/84	10/14/84	100	
	10/18/84	10/21/84	100	
	11/14/84	12/12/84	100	
	12/12/84	01/09/85	100	
	01/09/85	02/11/85	95	
	03/02/85	05/02/85	100	
	05/02/85	05/30/85	100	
	05/30/85	06/22/85	100	
	06/22/85	08/21/85	100	
	08/21/85	09/18/85	95	
	09/18/85	09/22/85	100	End of station
10	06/20/83	11/03/83	40	
	11/03/83	02/01/84	45	

(Continued)

Table 1 (Continued)

Tide Gage No.	Data Periods Beginning Date	Ending Date	Percentage of Data Retrieval	
10	02/01/84	03/01/84	100	
	03/01/84	03/29/84	100	
	03/29/84	04/26/84	100	
	04/26/84	05/24/84	100	
	05/24/84	06/20/84	100	
	06/20/84	08/08/84	100	
	08/08/84	08/23/84	100	
	08/23/84	09/19/84	100	
	09/19/84	10/17/84	100	
	10/17/84	11/14/84	100	
	11/14/84	12/12/84	99	
	12/12/84	01/09/85	100	
	01/09/85	02/13/85	70	
	05/30/85	06/22/85	100	
	06/22/85	08/22/85	95	
	08/22/85	09/19/85	100	
	09/19/85	11/14/85	90	
	11/14/85	12/05/85	100	
	12/05/85	02/12/86	100	End of station
31	06/08/83	11/01/83	95	
	11/01/83	11/29/83	95	
	11/29/83	02/15/84	75	
	02/15/84	02/28/84	100	
	02/28/84	03/27/84	100	
	03/27/84	04/24/84	100	
	04/24/84	05/22/84	100	
	05/22/84	06/19/84	100	
	06/19/84	07/24/84	100	
	07/24/84	08/21/84	100	
	08/21/84	09/18/84	100	
	01/08/85	02/12/85	100	
	02/12/85	03/01/85	100	
	03/01/85	04/30/85	100	
	04/30/85	05/29/85	100	
	05/29/85	06/22/85	100	
	06/22/85	07/23/85	100	
	07/23/85	08/20/85	100	
	08/20/85	09/17/85	100	
	09/17/85	11/13/85	100	
	11/13/85	12/02/85	90	
	12/03/85	01/07/86	100	
	01/07/86	02/12/86	100	End of station
32	05/26/83	10/29/83	75	
	11/04/83	01/31/84	75	
	01/31/84	02/28/84	100	
	02/28/84	03/27/84	100	
	03/27/84	04/24/84	100	

(Continued)

Table 1 (Continued)

Tide Gage No.	Data Periods Beginning Date	Ending Date	Percentage of Data Retrieval	
32	04/24/84	05/22/84	100	
	05/22/84	06/19/84	80	
	07/24/84	08/21/84	100	
	09/18/84	10/16/84	100	
	10/16/84	11/14/84	100	
	11/14/84	12/11/84	100	
	12/11/84	01/08/85	100	
	01/08/85	02/12/85	100	
	02/12/85	03/01/85	100	
	03/01/85	03/27/85	100	
	03/27/85	04/30/85	100	
	04/30/85	05/29/85	100	
	05/29/85	06/21/85	100	
	06/21/85	08/20/85	100	
	08/20/85	09/17/85	100	
	09/17/85	11/13/85	100	
	11/13/85	12/03/85	100	
	12/03/85	01/07/86	100	
	01/07/86	02/11/86	100	End of station
33	07/06/83	11/01/83	100	
	11/01/83	01/31/84	100	
	01/31/84	02/15/84	100	
	02/28/84	03/27/84	100	
	03/27/84	04/24/84	90	
	04/24/84	05/23/84	90	
	07/24/84	08/21/84	100	
	08/21/84	09/18/84	100	
	09/18/84	10/16/84	100	
	10/16/84	11/14/84	100	
	11/14/84	12/13/84	100	
	12/13/84	01/08/85	100	
	01/08/85	02/12/85	100	
	02/12/85	03/01/85	100	
	03/01/85	03/23/85	100	
	03/27/85	04/30/85	100	
	04/30/85	05/29/85	100	
	05/29/85	06/21/85	90	
	06/21/85	08/20/85	100	
	08/20/85	09/17/85	100	
33	09/17/85	11/13/85	100	
	11/13/85	12/03/85	99	
	12/02/85	01/07/86	100	
	01/07/86	02/11/86	100	End of station
34	06/09/83	08/04/83	50	
	08/04/83	11/03/83	99	
	11/03/83	12/18/83	95	

(Continued)

Table 1 (Continued)

Tide Gage No.	Data Periods Beginning Date	Ending Date	Percentage of Data Retrieval	
34	12/18/83	02/02/84	5	
	02/02/84	02/29/84	95	
	02/29/84	03/29/84	100	
	03/29/84	04/26/84	100	
	04/26/84	05/23/84	100	
	05/23/84	06/20/84	100	
	06/20/84	08/08/84	100	
	08/08/84	08/23/84	100	
	08/23/84	09/19/84	100	
	09/19/84	10/17/84	100	
	10/17/84	11/15/84	100	
	11/15/84	12/13/84	100	
	12/13/84	01/10/85	100	
	01/10/85	02/12/85	100	
	02/12/85	03/01/85	100	
	03/01/85	03/26/85	100	
	03/26/85	04/29/85	100	
	04/29/85	06/21/85	100	
	06/21/85	08/20/85	100	
	10/09/85	12/03/85	100	
	12/03/85	01/07/86	100	
	01/07/86	02/11/86	100	End of station
35	06/09/83	07/07/83	35	
	07/07/83	09/25/83	99	
	09/25/83	11/03/83	100	
	11/03/83	02/02/84	100	
	02/02/84	02/29/84	100	
	02/29/84	03/28/84	100	
	03/28/84	04/26/84	100	
	04/26/84	05/23/84	100	
	05/23/84	06/20/84	100	
	06/20/84	07/25/84	100	
	07/25/84	08/23/84	100	
	08/23/84	09/19/84	100	
	09/19/84	10/17/84	100	
	10/16/84	11/15/84	100	
35	11/15/84	01/10/85	100	
	01/10/85	02/14/85	95	
	02/14/85	03/03/85	100	
	03/03/85	05/01/85	100	
	05/01/85	05/28/85	99	
	05/28/85	06/23/85	100	
	06/23/85	07/25/85	100	
	07/25/85	08/22/85	95	
	08/22/85	09/19/85	95	
	09/19/85	10/27/85	100	

(Continued)

Table 1 (Concluded)

Tide Gage No.	Data Periods Beginning Date	Ending Date	Percentage of Data Retrieval	
35	11/12/85	12/02/85	100	
	12/05/85	01/08/86	100	
	01/08/86	02/11/86	100	End of station
36	07/21/83	11/03/83	99	
	11/03/83	12/15/83	95	
	12/15/83	12/21/83	99	
	03/14/84	03/25/84	100	End of station
37	06/07/83	11/03/83	99	
	11/03/83	02/02/84	90	
	02/02/84	02/29/84	85	
	02/29/84	03/28/84	95	
	03/28/84	04/26/84	95	
	04/26/84	04/30/84	100	
	05/23/84	06/20/84	99	
	06/20/84	07/25/84	99	
	08/23/84	09/19/84	100	
	09/19/84	10/17/84	100	
	10/17/84	10/22/84	95	
	11/15/84	12/13/84	99	
	12/13/84	01/10/85	95	
	01/10/85	02/14/85	85	
	02/14/85	03/01/85	95	
	03/01/85	05/01/85	99	
	05/01/85	05/28/85	100	
	05/28/85	06/23/85	100	
	08/22/85	09/18/85	100	
	09/18/85	10/28/85	100	
	11/14/85	11/17/85	100	
	12/03/85	01/07/86	100	
	01/07/86	02/11/86	100	End of station

Table 2

Tide and Current Meter Measurements

07-24/31-84 Data Collection

Date	Hour CST	Water Surface Elevation ft*	Speed fps	Current Direction deg**	Conductivity mmhos/cm	Temperature degoC
07/24	1000	14.32	0.49	142	5.00	29.17
	1100	14.31	0.39	143	5.00	28.98
	1200	14.31	0.39	142	5.00	28.98
	1300	14.31	0.42	143	5.00	28.98
	1400	14.31	0.55	147	5.00	30.54
	1500	14.30	0.42	151	5.00	30.83
	1600	14.22	0.22	139	5.00	31.03
	1700	14.17	0.09	154	5.00	30.05
	1800	14.12	0.16	329	5.00	30.15
	1900	14.08	0.26	327	5.00	30.05
	2000	14.04	0.26	323	5.00	30.05
	2100	14.01	0.26	326	5.00	29.96
	2200	14.00	0.29	324	5.00	29.76
	2300	13.97	0.36	320	5.00	29.57
07/25	0000	13.98	0.36	324	5.00	29.47
	0100	14.08	0.00	232	5.00	29.57
	0200	14.26	0.62	144	5.00	29.17
	0300	14.40	0.65	133	5.00	28.49
	0400	14.46	0.82	143	5.00	28.30
	0500	14.47	0.75	146	5.00	28.78
	0600	14.47	0.62	142	5.00	28.78
	0700	14.47	0.68	143	5.00	28.78
	0800	14.47	0.65	140	5.00	28.88
	0900	14.47	0.49	143	5.00	29.08
	1000	14.47	0.45	144	5.00	29.27
	1100	14.48	0.52	136	5.00	29.17
	1200	14.50	0.45	142	5.00	29.17
	1300	14.51	0.42	143	5.00	29.08
	1400	14.50	0.45	143	5.00	29.08
	1500	14.45	0.26	136	5.00	29.57
	1600	14.33	0.09	151	5.00	29.66
	1700	14.25	0.00	278	5.00	29.66
	1800	14.19	0.06	306	5.00	29.76
	1900	14.12	0.22	324	5.00	29.37
	2000	14.09	0.29	323	5.00	29.27
	2100	14.04	0.36	322	5.00	29.17
	2200	14.01	0.32	330	5.00	29.08
	2300	13.99	0.32	330	5.00	28.98
07/26	0000	13.99	0.32	330	5.00	28.88
	0100	14.02	0.16	322	5.00	29.08
	0200	14.10	0.00	153	5.00	29.08

(Continued)

* Datum is arbitrary.

** deg = direction from true north from which the current is flowing.

Table 2 (Continued)

Date	Hour CST	Water Surface Elevation ft	Speed fps	Current Direction deg**	Conductivity mmhos/cm	Temperature degoC
07/26	0300	14.21	0.45	142	5.00	28.69
	0400	14.34	0.62	137	5.00	28.49
	0500	14.42	0.98	156	5.00	28.49
	0600	14.46	0.85	137	5.00	28.30
	0700	14.48	0.75	144	5.00	28.39
	0800	14.51	0.75	144	5.00	28.69
	0900	14.51	0.59	140	5.00	29.08
	1000	14.51	0.52	140	5.00	29.37
	1100	14.51	0.55	140	5.00	29.47
	1200	14.53	0.59	144	5.00	29.37
	1300	14.54	0.68	146	5.00	29.37
	1400	14.54	0.19	144	5.00	29.27
	1500	14.50	0.19	135	5.00	29.76
	1600	14.42	0.22	174	5.00	30.93
	1700	14.29	0.06	151	5.00	30.15
	1800	14.23	0.00	157	5.00	30.25
	1900	14.16	0.09	338	5.00	31.03
	2000	14.14	0.22	324	5.00	30.64
	2100	14.08	0.32	323	5.00	30.15
	2200	14.04	0.29	322	5.00	29.76
	2300	14.00	0.32	324	5.00	29.66
07/27	0000	13.99	0.42	327	5.00	29.57
	0100	13.99	0.19	333	5.00	29.57
	0200	14.05	0.19	306	5.00	29.57
	0300	14.18	0.22	143	5.00	29.47
	0400	14.30	0.49	150	5.00	29.08
	0500	14.40	0.65	132	5.00	28.78
	0600	14.48	0.88	146	5.00	28.88
	0700	14.53	0.91	136	5.00	28.88
	0800	14.57	0.91	140	5.00	29.47
	0900	14.58	0.59	140	5.00	29.76
	1000	14.59	0.55	142	5.00	29.86
	1100	14.59	0.68	142	5.00	29.66
	1200	14.59	0.65	140	5.00	29.37
	1300	14.59	0.62	142	5.00	29.47
	1400	14.58	0.36	140	5.00	30.64
	1500	14.58	0.42	143	5.00	30.44
	1600	14.54	0.36	143	5.00	30.64
	1700	14.47	0.13	137	5.00	30.05
	1800	14.39	0.22	143	5.00	29.76
	1900	14.31	0.09	129	5.00	29.86
07/27	2000	14.23	0.00	359	5.00	30.05
	2100	14.17	0.16	327	5.00	29.86
	2200	14.13	0.16	327	5.00	29.76
	2300	14.09	0.39	319	5.00	29.76

(Continued)

Table 2 (Continued)

Date	Hour CST	Water Surface Elevation ft	Speed fps	Current Direction deg**	Conductivity mmhos/cm	Temperature degoC
07/28	0000	14.05	0.45	315	5.00	29.66
	0100	14.04	0.42	313	5.00	29.66
	0200	14.03	0.36	323	5.00	29.86
	0300	14.13	0.00	344	5.00	29.96
	0400	14.31	0.55	140	5.00	29.57
	0500	14.45	1.05	133	5.00	29.17
	0600	14.54	0.88	149	5.00	29.27
	0700	14.58	0.82	140	5.00	29.37
	0800	14.59	0.72	140	5.00	29.57
	0900	14.60	0.62	142	5.00	30.05
	1000	14.60	0.49	146	5.00	30.05
	1100	14.59	0.45	142	5.00	29.96
	1200	14.57	0.45	137	5.00	30.54
	1300	14.57	0.55	143	5.00	29.86
	1400	14.58	0.52	149	5.00	29.76
	1500	14.60	0.55	140	5.00	29.66
	1600	14.60	0.45	140	5.00	29.86
	1700	14.60	0.55	144	5.00	29.57
	1800	14.58	0.36	139	5.00	29.57
	1900	14.49	0.13	142	5.00	29.57
	2000	14.38	0.00	157	5.00	29.47
	2100	14.29	0.00	12	5.00	29.37
	2200	14.23	0.13	338	5.00	29.27
	2300	14.19	0.32	331	5.00	29.17
07/29	0000	14.15	0.32	322	5.00	29.08
	0100	14.09	0.45	323	5.00	28.98
	0200	14.05	0.52	327	5.00	28.88
	0300	14.04	0.45	319	5.00	28.88
	0400	14.08	0.26	324	5.00	28.88
	0500	14.20	0.06	137	5.00	28.88
	0600	14.34	0.62	143	5.00	28.78
	0700	14.45	1.05	144	5.00	29.08
	0800	14.50	0.88	143	5.00	28.98
	0900	14.54	0.68	136	5.00	29.17
	1000	14.54	0.59	142	5.00	29.66
	1100	14.54	0.45	144	5.00	29.66
	1200	14.53	0.42	142	5.00	29.76
	1300	14.52	0.45	139	5.00	29.86
	1400	14.51	0.00	106	5.00	30.54
07/29	1500	14.52	0.22	147	5.00	29.86
	1600	14.54	0.52	142	5.00	29.57
	1700	14.54	0.55	150	5.00	29.66
	1800	14.51	0.22	137	5.00	29.57
	1900	14.43	0.29	115	5.00	29.47
	2000	14.34	0.00	213	5.00	29.47
	2100	14.28	0.26	324	5.00	29.27

(Continued)

Table 2 (Continued)

Date	Hour CST	Water Surface Elevation ft	Speed fps	Current Direction deg**	Conductivity mmhos/cm	Temperature degoC
07/29	2200	14.21	0.42	323	5.00	29.08
	2300	14.16	0.45	324	5.00	28.88
07/30	0000	14.10	0.65	319	5.00	28.88
	0100	14.06	0.62	322	5.00	28.49
	0200	14.03	0.62	330	5.00	28.30
	0300	14.02	0.55	322	5.00	28.30
	0400	14.02	0.49	316	5.00	28.20
	0500	14.08	0.45	320	5.00	28.10
	0600	14.16	0.19	319	5.00	28.00
	0700	14.29	0.19	142	5.00	27.91
	0800	14.37	0.62	143	5.00	28.30
	0900	14.39	0.55	143	5.00	28.49
	1000	14.42	0.52	146	5.00	28.59
	1100	14.42	0.26	136	5.00	28.98
	1200	14.42	0.49	147	5.00	29.37
	1300	14.41	0.26	139	5.00	29.76
	1400	14.40	0.49	135	5.00	30.15
	1500	14.40	0.32	144	5.00	30.74
	1600	14.41	0.49	143	5.00	30.44
	1700	14.42	0.49	153	5.00	29.66
	1800	14.44	0.52	142	5.00	29.27
	1900	14.45	0.52	147	5.00	29.17
	2000	14.45	0.42	144	5.00	29.27
	2100	14.40	0.16	136	5.00	29.08
	2200	14.27	0.00	127	5.00	28.98
	2300	14.20	0.06	338	5.00	28.78
07/31	0000	14.12	0.42	320	5.00	28.78
	0100	14.05	0.49	319	5.00	28.59
	0200	14.02	0.55	320	5.00	28.49
	0300	14.00	0.49	317	5.00	28.30
	0400	13.99	0.32	324	5.00	28.00
	0500	14.02	0.45	324	5.00	28.00
	0600	14.13	0.00	313	5.00	28.00
	0700	14.30	0.42	142	5.00	27.81
	0800	14.30	0.68	129	5.00	28.00
	0900	14.30	0.62	137	5.00	28.49
07/31	1000	14.32	0.39	136	5.00	28.78
	1100	14.43	0.36	137	5.00	29.08
	1200	14.45	0.19	142	5.00	29.27
	1300	14.32	0.13	140	5.00	29.47
	1400	14.30	0.00	73	5.00	29.76
	1500	14.30	0.00	109	5.00	29.76
	1600	14.32	0.13	118	5.00	30.35
	1700	14.43	0.36	137	5.00	29.37
	1800	14.47	0.39	120	5.00	29.37

(Continued)

Table 2 (Concluded)

Date	Hour CST	Water Surface Elevation ft	Speed fps	Current Direction deg**	Conductivity mmhos/cm	Temperature degoC
07/31	1900	14.52	0.68	139	5.00	28.88
	2000	14.53	0.72	139	5.00	28.78
	2100	14.53	0.68	135	5.00	28.69
	2200	14.53	0.49	143	5.00	28.69
	2300	14.48	0.36	144	5.00	28.78
	0000	14.36	0.26	140	5.00	28.78

Table 3

List of Available Current Meter Data

Meter No.	Data Periods Beginning Date	Ending Date	Percentage of Data Retrieval Current Speed	Current Direction	Temp.	Conductivity
V-3	06/22/83	07/20/83	0	100	100	100
	07/20/83	08/31/83	90	100	100	10
	08/31/83	09/28/83	100	100	100	5
	End of station					
V-13	06/20/83	07/07/83	100	100	100	100
	07/07/83	08/04/83	90	100	100	100
	08/04/83	08/31/83	100	100	100	100
	08/31/83	09/29/83	90	100	100	100
	09/29/83	11/03/83	100	100	100	100
	03/01/84	03/29/84	Raw Data*			
	03/29/84	04/26/84	Raw Data*			
	04/26/84	05/24/84	Raw Data*			
	End of station					
V-14	06/22/83	07/20/83	100	100	100	100
	07/20/83	08/31/83	100	100	100	100
	08/31/83	09/28/83	80	100	100	80
	09/28/83	11/30/83	0	10	95	0
	02/01/84	03/01/84	100	100	100	100
	03/01/84	04/25/84	Raw Data*			
	04/25/84	05/24/84	Raw Data*			
	05/24/84	06/21/84	100	100	100	100
	06/21/84	08/09/84	95	95	95	95
	08/09/84	08/22/84	100	100	100	100
	08/22/84	10/02/84	95	100	100	100
	10/02/84	10/18/84	100	100	100	100
	10/18/84	11/14/84	40	50	100	100
	End of station					
V-30	06/21/84	08/09/84	15	85	100	100
	08/09/84	08/22/84	10	20	100	100
	08/22/84	10/02/84	10	15	100	100
	10/02/84	10/18/84	10	20	100	100
	10/18/84	11/14/84	10	75	100	100
	11/14/84	11/28/84	10	20	100	100
	01/09/85	02/13/85	90	90	100	100
	02/13/85	03/02/85	30	30	100	100
	05/02/85	05/30/85	100	100	0	0
	05/30/85	06/22/85	80	80	0	0
	06/22/85	07/24/85	30	40	0	0
	07/24/85	08/21/85	100	100	0	0
	08/21/85	12/04/85	Raw Data *			
	End of station					

(Continued)

* Data are stored on eight-track cartridges and may only be processed commercially.

Table 3 (Continued)

Meter No.	Data Periods Beginning Date	Ending Date	Percentage of Data Retrieval Current Speed	Current Direction	Temp.	Conductivity
V-31	06/08/83	07/06/83	0	0	100	100
	07/06/83	08/03/83	100	100	100	100
	08/03/83	08/30/83	90	100	100	100
	08/30/83	09/27/83	100	100	100	100
	09/27/83	11/01/83	90	100	100	100
	11/01/83	11/29/83	100	100	100	100
	11/29/83	01/31/84	70	70	100	100
	01/31/84	02/28/84	100	100	100	100
	02/28/84	03/27/84	Raw Data*			
	03/27/84	04/24/84	Raw Data*			
	04/24/84	05/22/84	Raw Data*			
	05/22/84	06/19/84	30	0	100	100
	06/19/84	07/24/84	100	90	100	5
	07/24/84	08/21/84	100	100	100	100
	08/21/84	09/18/84	65	100	100	100
	09/18/84	10/16/84	80	100	100	100
	10/16/84	11/14/84	100	100	100	100
	11/14/84	11/27/84	100	30	100	100
	07/23/85	08/20/85	100	75	100	100
	08/20/85	09/17/85	Raw Data*			
	09/17/85	02/12/86	Raw Data*			
	End of station					
V-32	06/08/83	07/06/83	100	0	100	100
	07/06/83	08/03/83	100	0	100	100
	08/03/83	08/30/83	100	90	100	100
	End of station					
V-33	06/08/83	07/06/83	100	10	100	100
	07/06/83	08/03/83	100	100	100	100
	08/03/83	08/30/83	100	100	100	100
	08/30/83	09/27/83	50	100	100	100
	09/27/83	11/01/83	85	100	100	65
	11/01/83	11/29/83	100	100	100	100
	11/29/83	01/14/84	Raw Data*			
V-33	01/31/84	02/28/84	100	100	100	100
	02/28/84	03/27/84	Raw Data*			
	03/27/84	04/24/84	Raw Data*			
	04/24/84	05/23/84	Raw Data*			
	05/23/84	06/19/84	100	0	100	100
	06/19/84	07/24/84	100	75	100	100
	07/24/84	08/21/84	100	100	100	100
	08/21/84	09/18/84	100	100	100	100
	09/18/84	10/16/84	50	80	50	20
	01/08/85	02/12/85	100	25	100	100
	02/12/85	03/01/85	100	50	100	100

(Continued)

Table 3 (Continued)

Meter No.	Data Periods Beginning Date	Ending Date	Percentage of Data Retrieval Current Speed	Current Direction	Temp.	Conductivity
V-33	03/01/85	03/27/85	100	100	100	100
	03/27/85	04/30/85	100	0	100	0
	04/30/85	05/29/85	70	10	100	100
	05/29/85	06/21/85	100	100	100	100
	06/21/85	07/23/85	30	100	100	100
	07/23/85	08/20/85	0	100	100	100
	08/20/85	09/17/85	Raw Data*			
	09/17/85	02/11/86	Raw Data*			
	End of station					
V-34	06/09/83	07/07/83	15	0	100	100
	07/07/83	08/04/83	70	0	100	100
	08/04/83	09/01/83	80	10	100	100
	09/01/83	09/29/83	80	70	100	100
	09/29/83	11/03/83	25	50	100	100
	11/03/83	12/14/83	25	25	100	100
	12/14/83	02/02/84	55	0	100	65
	02/02/84	02/29/84	85	0	100	100
	02/29/84	03/28/84	Raw Data*			
	03/28/84	04/26/84	Raw Data*			
	04/26/84	05/23/84	Raw Data*			
	05/23/84	06/20/84	15	0	100	100
	06/19/84	08/08/84	90	0	100	100
	08/08/84	08/23/84	100	0	100	100
	08/23/84	09/19/84	15	100	100	100
	09/19/84	10/17/84	100	80	100	100
	11/15/84	11/28/84	25	0	100	100
	01/10/85	02/12/85	95	0	100	100
	03/01/85	03/26/85	95	0	100	100
	03/26/85	04/29/85	100	0	100	100
	04/29/85	05/29/85	85	0	100	100
	05/29/85	06/21/85	100	0	100	100
	06/21/85	07/23/85	100	0	100	100
	07/23/85	08/20/85	100	15	100	100
	08/20/85	09/17/85	Raw Data*			
	09/17/85	12/03/85	Raw Data*			
	End of station					
V-35	06/09/83	07/07/83	100	100	100	100
	07/07/83	08/04/83	100	100	100	100
	08/04/83	09/01/83	100	100	100	100
	09/01/83	09/29/83	100	100	100	100
	09/29/83	11/03/83	100	100	100	100
	11/03/83	12/14/83	100	100	100	100
	12/14/83	02/02/84	100	100	100	100
	02/02/84	02/29/84	100	100	100	100
	02/29/84	03/28/84	Raw Data*			
	03/28/84	04/26/84	Raw Data*			

(Continued)

Table 3 (Concluded)

Meter No.	Data Periods		Percentage of Data Retrieval			
	Beginning Date	Ending Date	Current Speed	Current Direction	Temp.	Conductivity
V-35	04/26/84	05/23/84	Raw Data*			
	05/23/84	06/20/84	100	100	100	100
	06/19/84	07/25/84	70	80	100	10
	07/25/84	08/23/84	85	85	100	0
	08/23/84	09/19/84	40	40	40	0
	07/25/85	08/22/85	80	100	100	100
	08/22/85	09/19/85	Raw Data*			
	09/19/85	02/11/86	Raw Data*			
	End of station					
V-36	06/23/83	07/07/83	100	100	100	100
	07/07/83	08/04/83	100	100	100	100
	08/04/83	09/01/83	100	100	100	100
	09/01/83	09/29/83	100	100	100	100
	09/29/83	11/03/83	100	100	100	100
	11/03/83	12/14/83	100	100	100	100
	12/14/83	02/02/84	80	100	100	100
	02/02/84	03/14/84	100	100	100	100
	End of station					

Table 4

Data Collection Dates for Discharge Measurements

Suspended Sediment Samples and Salinity Samples

Date	Discharge Measurements R1-R7	Salinity Measurements R1-R7	Salinity Measurements SG1-14	Suspended Sediments R1-R7
		1983		
06/07/83	X			
06/20/83	X	X	X	
07/06/83	X	X	X	
07/19/83	X	X	X	
08/03/83	X	X	X	
08/16/83	X	X		
08/30/83	X	X	X	X
09/14/83	X	X		X
09/27/83	X	X	X	X
11/01/83	X			
11/29/83	X	X		
12/13/83	X	X	X	
		1984		
01/04/84	X	X		X
01/31/84	X	X	X	X
02/15/84	X	X		X
02/28/84	X	X	X	X
03/13/84	X	X	X	X
03/29/84	X	X	X	X
04/24/84	X	X	X	X
05/08/84	X	X		X
05/23/84	X	X	X	X
06/05/84	X	X		X
06/19/84	X	X	X	X
07/10/84	X	X		X
07/24/84	X	X		X
08/07/84	X	X	X	
08/21/84	X	X	X	
09/18/84	X	X	X	
10/02/84	X	X		X
10/16/84	X	X	X	
10/30/84	X	X		
11/14/84	X	X	X	
11/27/84	X	X		
12/12/84	X	X	X	
		1985		
01/08/85	X	X	X	
02/12/85	X	X	X	X
03/01/85	X	X	X	X
03/13/85	X	X	X	X
04/30/85	X	X	X	X
05/14/85	X	X		X

(Continued)

Table 4 (Concluded)

Date	Discharge Measurements R1-R7	Salinity Measurements R1-R7	Salinity Measurements SG1-14	Suspended Sediments R1-R7
		1985 (Cont.)		
05/29/85	X	X	X	X
06/22/85	X	X	X	X
07/09/85	X	X		X
07/23/85	X	X	X	X
08/20/85	X	X	X	X
09/17/85	X	X	X	X
10/10/85	X	X	X	X
11/14/85	X	X	X	X
12/03/85	X	X	X	X
		1986		
01/07/86	X	X	X	X

Table 5

Discharge Measurements

Range 7 Intracoastal Waterway Mile 62

Date	Time CST	Distance ft	Overall Depth ft	Sample Depth ft	Current Direction deg	Current Speed fps
12/13/83	1345	3	5.2	Waters edge-right bank		
	1349	42	10.3	2.1	240	0.6
	1350			6.2	250	0.5
	1351			8.2	250	0.5
	1355	84	14.0	2.8	220	0.8
	1356			8.4	210	0.8
	1357			11.2	210	0.6
	1400	126	19.2	11.5	200	1.1
	1404	174	21.2	4.2	205	1.1
	1405			12.7	210	1.0
	1406			17.0	210	1.0
	1408	216	21.8	13.1	220	0.8
	1411	261	19.0	3.8	210	0.8
	1412			11.4	210	0.8
	1413			15.2	210	0.6
	1417	306	10.0	6.0	210	1.0
	1420	351	2.0	Water's edge-left bank		

Table 6

Discharge Measurements, Suspended Sediment and Salinity Samples

Range 1

Date	Time CST	Maximum Depth ft	Current Direction deg	Speed fps Min	Speed fps Max	Salinity ppt S	Salinity ppt M	Suspended Sediment mg/l S	Suspended Sediment mg/l M
			1983						
06/07	1058-1118	27.5	180-300	0.8	1.8	-	-	-	-
06/21	0915-0928	26.0	270-290	0.6	1.4	0.2	0.2	-	-
07/06	0831-0850	25.0	0-90	0.3	0.4	0.2	0.2	-	-
07/19	0805-0820	22.8	100-140	0.0	0.4	0.2	0.2	-	-
08/03	0855-0913	22.4	280-300	0.8	1.6	0.3	0.3	-	-
08/16	1110-1125	24.0	270-300	0.4	1.0	2.7	2.6	-	-
08/30	1025-1040	22.5	110-120	1.0	1.6	0.0	0.0	27	52
09/14	0735-0750	23.5	110-120	1.0	1.6	2.5	2.5	38	54
09/27	1030-1045	23.7	110-120	0.8	1.6	1.1	1.1	17	21
11/01	0910-0935	23.3	120-200	0.4	1.0	-	-	-	-
11/29	1140-1155	24.3	110-130	0.4	0.8	0.1	0.1	-	-
12/13	0852-0912	26.5	280-315	0.4	1.0	0.1	0.1	-	-
			1984						
01/04	1205-1220	23.8	80-90	0.2	1.0	0.1	0.1	10	78
01/31	1155-1207	22.3	110-120	0.8	1.5	0.0	0.0	134	172
02/15	0855-0910	22.7	100-120	0.9	1.8	0.0	0.0	68	84
02/28	0901-0923	22.2	58-160	0.7	1.6	0.0	0.0	266	262
03/13	0911-0925	25.2	55-125	0.0	0.3	0.0	0.0	140	184
03/29	1340-1405	24.0	273-95	0.2	1.7	0.0	0.0	290	304
04/24	1325-1342	23.8	280-305	1.3	2.2	0.0	0.0	108	244
05/08	0912-0932	22.9	105-142	0.3	1.0	0.6	0.6	90	94
05/22	0817-0834	24.0	277-306	1.1	2.1	0.0	0.0	110	174
06/05	0950-1005	23.3	280-290	1.1	2.8	0.0	0.0	96	134
06/19	0809-0827	26.1	285-322	0.3	1.2	0.0	0.0	54	66
07/10	0826-0835	25.1	282-307	0.4	0.9	1.8	2.0	40	206
07/24	0750-0805	27.8	152-294	0.4	1.1	1.7	1.7	84	196
08/07	0800-0810	21.2	81-183	0.2	0.4	0.0	0.0	-	-
08/21	0800-0820	23.0	310-347	0.2	0.9	0.0	0.0	-	-
09/18	0805-0825	25.5	176-330	0.3	0.6	0.1	0.1	-	-
10/02	0840-0850	24.7	255-275	0.0	0.4	0.3	0.3	28	28
10/16	0750-0810	28.1	262-306	0.7	1.7	0.0	0.0	-	-
10/30	0835-0850	28.1	140-224	0.2	0.5	0.0	0.0	-	-
11/14	0853-0912	25.8	180-330	0.2	0.6	0.0	0.0	-	-
11/27	0815-0830	28.7	280-45	0.5	1.0	0.0	0.0	-	-
12/12	0800-0815	23.7	264-57	0.2	0.7	0.0	0.0	-	-
01/08	0915-0930	25.6	200-272	0.2	0.9	0.0	0.0	-	-

(Continued)

Note: Min = minimum speed
Max = maximum speed
S = 2 ft below water surface
M = middepth

Table 6 (Concluded)

Date	Time CST	Maximum Depth ft	Current Direction deg	Speed fps Min	Speed fps Max	Salinity ppt S	Salinity ppt M	Suspended Sediment mg/l S	Suspended Sediment mg/l M
			1985						
02/12	0905–0915	22.2	120–130	1.1	2.8	0.5	0.2	160	194
03/01	0918–0930	28.5	235–315	0.1	0.6	0.0	0.0	168	246
03/13	1020–1048	27.4	290–304	1.1	1.8	0.0	0.0	214	306
04/30	0748–0802	25.0	120–172	0.2	0.5	0.0	0.0	50	68
05/14	1225–1240	24.5	240–308	1.0	1.8	0.0	0.0	128	320
05/29	0930–0940	28.6	270–304	0.7	1.1	0.0	0.0	60	94
06/22	0810–0821	27.0	300–310	1.4	3.0	0.0	0.0	270	436
07/09	0750–0805	23.0	70–191	0.3	0.7	0.0	0.0	28	64
07/23	0950–1007	26.9	268–300	1.0	1.7	0.0	0.0	44	64
08/20	0925–0943	25.4	90–110	0.4	1.4	1.4	1.8	36	42
09/17	0942–1000	25.6	94–130	0.2	1.5	0.1	0.1	36	40
10/10	0931–0942	22.4	270–292	0.6	1.3	0.0	0.0	29	21
11/14	1600–1614	21.6	70–190	0.2	0.7	0.0	0.0	69	17
12/03	0903–0913	22.4	268–300	0.4	0.8	0.0	0.0	194	251
			1986						
01/07	0855–0909	23.6	88–110	1.2	1.9	0.0	0.0	78	92

Table 7

Discharge Measurements, Suspended Sediment and Salinity Samples

Range 2

Date	Time CST	Maximum Depth ft	Current Direction deg	Speed fps Min	Speed fps Max	Salinity ppt S	Salinity ppt M	Suspended Sediment mg/l S	Suspended Sediment mg/l M
			1983						
06/07	1210-1224	27.2	190-210	0.6	1.4	-	-	-	-
06/21	0950-1005	23.8	180-240	0.4	0.8	0.2	0.2	-	-
07/06	0925-0938	26.7	10-60	0.2	0.6	0.2	0.2	-	-
07/19	0850-0903	25.5	30-100	0.2	0.5	0.2	0.2	-	-
08/03	0930-0945	23.4	210-230	0.6	1.2	0.3	0.3	-	-
08/16	1040-1055	24.0	190-300	0.2	0.6	2.7	2.4	-	-
08/30	1110-1125	24.4	30-60	0.6	1.6	0.0	0.0	36	37
09/14	0805-0820	24.5	10-120	0.6	1.2	2.1	2.1	46	51
09/27	1130-1143	24.5	20-60	0.6	1.2	0.4	0.7	39	39
11/01	0950-1005	21.4	290-340	0.2	0.8	-	-	-	-
11/29	1250-1305	24.9	20-30	0.2	0.8	0.1	0.1	-	-
12/13	0933-0948	24.8	200-270	0.4	0.5	0.1	0.1	-	-
			1984						
01/04	1315-1330	26.0	10-70	0.4	0.8	0.0	0.0	108	120
01/31	1250-1305	23.4	15-30	0.6	1.2	0.0	0.0	116	144
02/15	0920-0930	24.5	10-40	0.6	1.6	0.0	0.0	90	96
02/28	0943-		ROUGH CONDITIONS			0.0	0.0	274	294
03/13	0943-0956	26.3	320-5	0.1	0.3	0.0	0.0	182	126
03/27	0920-0942	26.0	245-29	0.3	1.0	0.0	0.0	140	138
04/24	1404-1420	25.7	160-220	0.7	1.4	0.0	0.0	90	106
05/08	0948-1000	25.0	0-60	0.3	1.2	0.6	0.6	102	112
05/22	0850-0905	26.6	183-222	0.4	1.3	0.0	0.0	68	108
06/05	0915-0935	28.1	200-220	0.8	1.9	0.0	0.0	70	88
06/19	0847-0903	25.0	160-190	0.4	1.0	0.0	0.0	34	54
07/10	0850-0900	27.2	230-258	0.3	0.8	1.7	1.7	80	134
07/24	0825-0840	26.1	200-310	0.4	1.2	1.3	1.3	66	78
08/07	0825-0835	24.2	345-42	0.4	0.7	0.0	0.0	-	-
08/21	0835-0850	25.8	194-271	0.2	0.5	0.0	0.0	-	-
09/18	0840-0857	23.5	160-292	0.3	0.8	0.0	0.0	-	-
10/02	0815-0825	26.7	201-230	0.0	0.8	0.3	0.3	40	64
10/16	0820-0840	26.0	140-350	0.8	1.6	0.0	0.0	-	-
10/30	0905-0915	27.8	315-25	0.2	0.7	0.1	0.0	-	-
11/14	0930-0950	26.8	170-330	0.6	0.8	0.0	0.0	-	-
11/27	0845-0900	22.3	40-181	0.6	1.4	0.0	0.0	-	-
12/12	0725-0745	25.8	170-300	0.1	0.3	0.0	0.0	-	-
			1985						
01/08	0945-1000	26.5	240-338	0.1	0.3	0.0	0.0	-	-
02/12	1014-1029	24.7	320-110	0.7	1.5	0.2	0.2	155	168
03/01	1022-1035	26.0	130-170	0.1	0.3	0.0	0.0	76	80
03/13	1103-1114	25.9	110-120	0.6	1.5	0.0	0.0	48	168
04/30	0841-0852	27.5	38-90	0.2	0.9	0.0	0.0	40	58

(Continued)

Table 7 (Concluded)

Date	Time CST	Maximum Depth ft	Current Direction deg	Speed fps Min	Speed fps Max	Salinity ppt S	Salinity ppt M	Suspended Sediment mg/l S	Suspended Sediment mg/l M
05/14	1250–1305	25.4	129–214	0.9	1.8	0.0	0.0	112	148
05/29	1012–1028	26.1	160–250	0.8	1.4	0.0	0.0	42	58
06/22	0720–0735	27.9	210–250	0.8	1.4	0.0	0.0	72	92
07/09	0825–0835	26.0	245–110	0.3	0.7	0.0	0.0	50	62
07/23	1034–1047	26.4	184–220	0.2	1.5	0.0	0.0	42	70
08/20	1028–1043	26.5	14–20	1.0	1.5	1.7	1.7	30	43
09/17	1055–1113	24.3	350–40	1.0	1.6	0.2	0.2	51	59
10/10	0954–1010	25.5	186–230	0.3	1.7	0.0	0.0	28	28
11/13	1341–1356	23.7	340–25	0.2	2.2	0.0	0.0	66	81
12/03	1022–1040	26.9	130–242	0.2	0.5	0.0	0.0	148	147
			1986						
01/07	0955–1011	26.6	16–42	1.2	1.7	0.0	0.0	94	81

Table 8

Discharge Measurements, Suspended Sediment and Salinity Samples

Range 3

Date	Time CST	Maximum Depth ft	Current Direction deg	Speed fps Min	Speed fps Max	Salinity ppt S	Salinity ppt M	Suspended Sediment mg/l S	Suspended Sediment mg/l M
			1983						
06/07	0952-1004	13.2	290-350	0.8	1.6	–	–	–	–
06/21	1020-1035	11.7	300-320	0.6	1.4	0.2	0.2	–	–
07/06	0947-1004	11.4	300-340	0.4	0.8	0.2	0.2	–	–
07/19	0914-0923	9.8	300-0	0.2	0.6	0.2	0.2	–	–
08/03	1015-1035	10.3	290-340	0.8	1.2	0.3	0.3	–	–
08/16	1015-1030	9.0	270-300	0.2	0.6	2.3	2.2	–	–
08/30	1130-1145	9.8	330-180	0.2	0.8	0.0	0.0	42	47
09/14	0825-0845	8.7	130-160	0.2	0.8	2.0	2.1	40	56
09/27	1150-1205	9.8	90-170	0.4	0.6	0.5	0.5	63	86
11/01	1110-1120	7.1	210-270	0.2	0.6	–	–	–	–
11/29	1310-1320	10.4	100-130	0.2	0.4	0.1	0.1	–	–
12/13	1000-1015	10.8	270-340	0.3	0.8	0.1	0.1	–	–
			1984						
01/04	1340-1405	11.7	300-330	0.2	0.4	0.0	0.0	118	120
01/31	1315-1330	9.4	60-180	0.2	0.6	0.0	0.0	134	186
02/15	0940-0950	10.4	140-215	0.3	0.5	0.0	0.0	68	68
02/28	1017-1030	11.8	295-55	0.7	1.4	0.0	0.0	256	274
03/13	1007-1015	11.3	305-320	0.2	0.7	0.0	0.0	184	172
03/27	1030-1043	12.0	315-22	0.3	1.2	0.0	0.0	122	122
04/24	1430-1445	12.5	315-325	0.8	1.6	0.0	0.0	88	46
05/08	1010-1020	11.9	300-0	0.8	1.6	0.6	0.6	–	–
05/22	0918-0932	10.6	332-9	0.3	1.3	0.0	0.0	102	116
06/05	1020-1035	11.0	320-330	1.0	1.7	0.0	0.0	88	110
06/19	0912-0927	11.6	170-340	0.4	1.0	0.0	0.0	48	56
07/10	0910-0920	11.6	280-335	0.8	1.3	1.4	1.5	46	56
07/24	0850-0900	11.7	235-310	0.4	0.7	1.1	1.2	58	68
08/07	0840-0850	9.2	288-322	0.5	0.8	0.0	0.0	–	–
08/21	0900-0912	10.0	350-85	0.1	0.5	0.0	0.0	–	–
09/18	0905-0915	9.5	305-332	0.2	0.6	0.0	0.0	–	–
10/02	0755-0805	11.2	190-275	0.0	0.2	0.4	0.5	48	78
10/16	0853-0908	12.6	274-324	0.6	1.6	0.0	0.0	–	–
10/30	0930-0940	11.5	200-308	0.3	0.6	0.1	0.1	–	–
11/14	1035-1048	10.5	210-280	0.3	0.8	0.0	0.0	–	–
11/27	0915-0925	11.6	298-340	1.1	2.2	0.0	0.0	–	–
12/11	1030-1045	10.5	180-351	0.1	0.3	0.0	0.0	–	–
			1985						
01/08	0840-0855	11.7	294-328	0.3	1.2	0.0	0.0	–	–
02/12	1039-1052	11.1	340-180	0.3	1.0	0.2	0.2	161	169
03/01	1048-1055	12.0	315-352	0.3	1.4	0.0	0.0	80	82

(Continued)

Table 8 (Concluded)

Date	Time CST	Maximum Depth ft	Current Direction deg	Speed fps Min	Speed fps Max	Salinity ppt S	Salinity ppt M	Suspended Sediment mg/l S	Suspended Sediment mg/l M
			1985 Cont.						
03/13	1122-1132	12.8	306-310	0.8	1.6	0.0	0.0	158	164
04/30	0903-0914	11.1	170-78	0.1	0.5	0.0	0.0	44	60
05/14	1115-1205	11.4	290-345	0.5	1.4	0.0	0.0	132	130
05/29	1037-1049	12.0	324-360	0.9	1.2	0.0	0.0	52	62
06/22	0700-0715	12.0	280-330	0.5	1.4	0.0	0.0	100	98
07/09	0845-0855	11.0	272-15	0.1	0.5	0.0	0.0	50	58
07/23	1057-1103	11.5	320-335	0.4	1.1	0.0	0.0	50	58
08/20	1055-1109	10.8	80-270	0.1	0.3	1.4	2.0	50	59
09/17	1123-1136	9.3	108-120	0.3	0.9	0.2	0.2	54	62
10/10	0915-0918	11.0	274-318	0.3	0.9	0.0	0.0	49	58
11/13	1447-1502	11.8	100-190	0.3	0.8	0.0	0.0	55	63
12/03	1047-1100	11.1	300-342	0.3	0.6	0.0	0.0	108	116
			1986						
01/07	1016-1033	12.4	260-320	0.2	0.5	0.0	0.0	80	68

Table 9

Discharge Measurements, Suspended Sediment and Salinity Samples

Range 4

Date	Time CST	Maximum Depth ft	Current Direction deg	Speed fps Min	Speed fps Max	Salinity ppt S	Salinity ppt M	Suspended Sediment mg/l S	Suspended Sediment mg/l M
			1983						
06/07	1327-1402	21.5	270-320	0.4	2.6	-	-	-	-
06/21	1115-1140	21.1	270-280	0.8	2.2	0.2	0.2	-	-
07/06	1110-1127	21.2	270-300	0.5	1.0	0.2	0.2	-	-
07/19	1000-1019	20.4	270-290	0.4	1.0	0.2	0.2	-	-
08/03	1140-1205	20.3	250-270	0.6	1.8	0.3	0.3	-	-
08/16	0924-0950	19.6	240-300	0.2	1.2	1.6	1.6	-	-
08/30	0920-0940	20.5	260-310	0.4	1.0	0.0	0.0	28	32
09/14	0915-0935	19.6	60-100	0.4	0.8	2.1	2.1	44	96
09/27	0925-0945	19.8	270-280	0.4	1.0	0.0	0.0	73	72
11/01	1155-1220	20.2	20-210	0.4	0.8	-	-	-	-
11/29	1035-1100	19.9	30-100	0.2	0.6	0.1	0.1	-	-
12/13	1050-1121	20.3	220-330	0.2	0.9	0.1	0.1	-	-
			1984						
01/04	1015-1045	20.4	270-290	0.8	1.4	0.0	0.0	100	96
01/31	1040-1105	19.0	160-200	0.8	1.1	0.0	0.0	44	46
02/15	1045-1115	20.3	60-310	0.3	1.0	0.0	0.0	48	68
02/28	1125-1152	20.2	249-290	0.5	1.6	0.0	0.0	126	134
03/13	1045-1103	20.3	260-281	0.6	1.4	0.0	0.0	170	176
03/29	1110-1133	19.6	230-300	0.4	1.7	0.0	0.0	126	118
04/24	1210-1232	21.4	260-285	0.4	2.1	0.0	0.0	82	82
05/08	0812-0827	21.0	260-275	0.8	1.7	0.5	0.5	-	-
05/22	1045-1110	21.3	265-284	0.6	1.8	0.0	0.0	88	102
06/05	0830-0845	22.3	270-280	1.0	2.1	0.0	0.0	94	88
06/19	1018-1039	23.2	270-285	0.7	1.5	0.0	0.0	28	30
07/10	1125-1140	19.4	260-295	0.4	1.9	1.3	1.3	54	60
07/24	1305-1325	21.1	252-300	0.3	1.4	1.3	1.1	54	64
08/07	1030-1045	20.5	208-280	0.6	1.2	0.0	0.0	-	-
08/21	1310-1330	20.0	218-351	0.3	1.1	0.0	0.0	-	-
09/18	1310-1325	20.0	135-330	0.0	0.5	0.0	0.0	-	-
10/02	1400-1415	18.7	82-120	0.0	0.1	1.3	1.3	48	70
10/16	1220-1240	22.3	240-280	0.4	1.3	0.0	0.0	-	-
10/30	1005-1020	21.9	268-292	0.4	1.6	0.0	0.0	-	-
11/14	1141-1220	20.6	240-312	0.4	1.1	0.0	0.0	-	-
11/27	0945-1005	20.6	268-310	0.6	2.5	0.0	0.0	-	-
12/11	1240-1255	22.1	271-286	0.5	1.3	0.0	0.0	-	-
			1985						
01/08	1545-1605	20.3	272-285	0.8	1.4	0.0	0.0	-	-
02/12	1342-1407	20.4	260-310	0.5	1.2	0.2	0.2	68	79
03/01	1330-1350	21.0	254-294	0.6	1.4	0.2	0.2	60	66

(Continued)

Table 9 (Concluded)

Date	Time CST	Maximum Depth ft	Current Direction deg	Speed fps Min	Speed fps Max	Salinity ppt S	Salinity ppt M	Suspended Sediment mg/l S	Suspended Sediment mg/l M
			1985 Cont.						
03/13	1345–1359	21.7	296–306	1.1	2.3	0.2	0.2	106	124
04/30	1135–1158	21.3	260–310	0.4	1.1	0.2	0.2	42	50
05/14	0945–1000	21.8	275–291	0.6	2.0	0.2	0.2	118	136
05/29	1333–1350	21.2	270–340	0.5	1.4	0.2	0.2	54	58
06/21	1030–1045	20.5	270–300	0.9	1.9	0.2	0.2	54	66
07/09	1055–1115	20.0	277–302	0.5	1.1	0.2	0.2	28	20
07/23	1308–1332	21.5	240–310	0.4	1.5	0.2	0.2	40	54
08/20	1312–1332	21.5	120–290	0.1	0.3	2.5	2.6	16	20
09/17	1344–1359	21.4	70–120	0.5	1.2	0.2	0.2	24	32
10/10	0710–0752	21.2	188–290	0.8	1.7	0.0	0.0	47	62
11/13	1251–1315	20.6	260–340	0.1	0.5	0.0	0.0	52	55
12/03	1121–1141	20.7	270–307	0.3	1.1	0.0	0.0	68	80
			1986						
01/07	1103–1123	20.7	260–330	0.4	0.8	0.0	0.0	56	82

Table 12 (Concluded)

Date	Time CST	Maximum Depth ft	Current Direction deg	Speed fps Min	Speed fps Max	Salinity ppt S	Salinity ppt M	Suspended Sediment mg/l S	Suspended Sediment mg/l M
			1985						
01/08	1500–1525	22.5	170–238	0.4	1.7	0.0	0.0	–	–
02/12	1538–1557	20.4	160–200	0.6	1.2	0.2	0.3	86	108
03/01	1520–1540	22.0	140–200	0.4	1.2	0.0	0.0	80	94
03/13	1528–1544	21.3	190–200	0.6	1.5	0.0	0.0	40	130
04/30	1503–1531	22.0	190–240	0.6	1.7	0.0	0.0	80	42
05/14	0830–0900	20.6	172–230	0.4	1.3	0.0	0.0	178	134
05/29	0624–0643	23.6	60–260	0.4	1.4	0.0	0.0	34	58
06/22	0800–0820	20.0	180–240	0.3	1.1	0.0	0.0	70	58
07/09	1240–1300	22.5	176–194	0.5	1.0	0.0	0.0	32	62
07/23	0705–0725	21.8	180–214	*	*	0.0	0.0	28	54
08/20	0620–0643	22.5	170–200	0.3	0.8	1.8	1.8	33	31
09/17	0701–0728	23.3	330–58	0.0	0.5	0.4	0.4	51	65
10/10	1636–1655	51.6	180–30	0.1	0.5	0.0	0.4	50	48
11/14	0910–0945	23.6	210–270	0.2	0.8	0.0	0.0	54	58
12/03	1457–1517	21.8	190–220	0.7	1.8	0.0	0.0	120	152
			1986						
01/07	1357–1417	22.3	180–222	0.6	1.4	0.0	0.0	64	90

Table 17

Discrete Salinity and Suspended Sediment Samples

SG 6

Date	Time CST	Maximum Depth ft	Salinity ppt S	Salinity ppt M	Suspended Sediment mg/l S	Suspended Sediment mg/l M
		1983				
06/20	1122	3.0	0.3	-	-	-
07/07	-	6.4	0.3	0.3	-	-
08/31	1025	6.4	0.5	-	-	-
11/03	-	6.4	16.4	17.5	-	-
12/14	-	5.0	0.4	0.4	-	-
		1984				
02/01	-	7.6	0.0	0.0	-	-
03/01	1220	7.0	-	0.0	-	294
05/24	0910	4.0	2.0	3.0	24	38
06/20	0759	6.4	0.0	0.1	56	60
08/07	-	8.0	1.1	1.2	-	-
08/22	-	6.0	0.0	0.0	-	-
11/14	-	4.0	1.1	1.1	-	-
12/13	-	3.0	3.4	3.4	-	-
		1985				
01/09	-	7.0	0.0	0.0	-	-
02/13	0940	10.0	0.2	0.2	32	38
05/02	0958	8.0	0.0	0.0	126	162
05/30	0935	8.0	0.0	0.0	108	100
07/24	0830	6.4	0.0	0.0	70	68
08/22	0832	6.4	7.3	7.3	21	16
09/19	0833	6.4	10.3	10.3	17	13
11/14	1300	6.4	-	4.5	-	274
12/05	0930	6.4	0.0	1.0	104	102

Table 18

Discrete Salinity and Suspended Sediment Samples

SG 7

Date	Time CST	Maximum Depth ft	Salinity ppt S	Salinity ppt M	Suspended Sediment mg/l S	Suspended Sediment mg/l M
		1983				
06/20	1231	14.0	0.3	-	-	-
07/07	-	14.0	0.4	0.4	-	-
07/21	-	14.0	0.6	0.6	-	-
08/04	-	14.0	0.5	0.5	-	-
09/01	0913	14.0	0.6	1.2	41	32
09/29	1023	14.0	4.0	4.0	16	32
11/03	-	14.0	9.2	-	-	-
12/14	-	14.0	2.7	2.9	-	-
		1984				
02/02	1012	14.0	0.7	0.7	370	368
03/14	1139	14.0	0.9	0.9	78	148
04/26	1110	14.0	0.5	0.6	244	342
05/24	1037	14.0	0.2	0.2	16	30
06/20	0850	14.0	0.1	0.1	20	42
08/07	-	14.0	0.6	0.6	-	-
08/22	-	14.0	0.0	0.0	-	-
10/17	-	12.0	10.0	10.1	-	-
11/15	-	13.0	5.4	5.5	-	-
12/13	-	13.0	0.9	0.9	-	-
		1985				
01/10	-	12.0	0.2	0.2	-	-
03/14	-	14.0	1.0	1.0	58	64
03/26	1305	14.0	0.1	0.1	68	70
05/01	1158	14.0	0.2	0.2	36	48
06/23	0743	14.0	1.8	1.9	36	34
07/25	0745	14.0	0.0	0.0	40	74
08/22	0936	13.0	2.9	3.1	15	14
09/19	0931	14.0	5.8	5.9	30	45
11/12	1520	14.0	5.2	5.4	50	42
12/05	1008	14.0	3.5	3.4	48	60

Table 19

Discrete Salinity and Suspended Sediment Samples

SG 8

Date	Time CST	Maximum Depth ft	Salinity ppt S	Salinity ppt M	Suspended Sediment mg/l S	Suspended Sediment mg/l M
		1983				
06/20	1231	14.0	0.3	-	-	-
06/20	1248	3.0	0.5	-	-	-
07/07	-	3.0	0.5	0.5	-	-
07/21	-	3.0	1.2	1.2	-	-
08/04	-	3.0	2.4	2.4	-	-
09/01	0817	3.0	3.7	3.8	13	25
09/29	0809	3.0	13.3	13.7	12	17
11/03	-	3.0	12.8	-	-	-
12/14	-	3.0	1.2	1.2	-	-
		1984				
02/02	0841	3.0	1.3	1.3	136	100
02/29	0910	3.0	0.6	0.6	168	174
03/14	0903	-	1.2	1.2	198	210
04/26	0900	3.5	2.7	2.6	84	116
05/24	1015	6.0	3.1	3.1	8	22
06/20	0718	8.0	1.0	1.1	20	26
08/08	-	9.0	3.0	3.0	-	-
08/23	-	3.0	0.0	0.0	-	-
09/18	-	8.0	2.7	2.7	-	-
10/17	-	4.0	14.6	15.7	-	-
11/15	-	3.0	6.4	6.4	-	-
		1985				
01/10	-	3.0	0.7	0.7	-	-
02/13	0850	3.0	1.3	1.6	132	120
03/03	0855	4.0	1.9	1.9	54	58
03/14	0844	3.0	1.9	2.0	42	46
03/26	1240	4.0	0.4	0.4	122	206
05/01	1133	3.0	2.2	2.3	38	38
05/28	1145	6.0	1.6	1.6	52	60
06/23	0730	3.0	0.0	0.0	30	24
07/25	0726	3.0	0.0	0.0	78	86
08/22	0750	3.0	6.7	6.7	19	24
09/19	0756	3.0	9.5	9.9	18	15
11/12	1506	3.0	8.9	8.9	22	28
12/05	0840	3.0	5.7	5.7	26	44
		1986				
01/07	0853	3.0	1.5	1.5	136	146

Table 23

Discrete Salinity and Suspended Sediment Samples

SG 12

Date	Time CST	Maximum Depth ft	Salinity ppt S	Salinity ppt M	Suspended Sediment mg/l S	Suspended Sediment mg/l M
		1983				
06/20	1426	10.0	0.3	-	-	-
07/07	-	10.0	0.2	0.2	-	-
07/21	-	10.0	0.3	0.3	-	-
08/04	-	10.0	0.3	0.3	-	-
09/01	1042	10.0	0 0	0.0	6	6
09/29	1200	10.0	0.0	0.0	38	40
11/03	-	10.0	0.2	0.3	-	-
12/14	-	10.0	0.1	0.1	-	-
		1984				
02/02	1135	10.0	0.0	0.0	60	64
02/29	1300	10.0	0.0	0.0	114	116
03/14	1242	10.0	0.0	0.0	108	120
03/29	1310	10.0	0.0	0.0	62	-
04/26	1235	10.0	0.0	0.0	18	54
05/23	0958	10.0	0.0	0.0	98	48
06/20	1000	10.0	0.0	0.0	32	34
08/08	-	7.0	0.0	0.0	-	-
08/23	-	10.0	0.0	0.0	-	-
09/18	-	10.0	0.1	0.1	-	-
10/17	-	10.0	6.0	6.0	-	-
11/15	-	7.0	0.2	0.2	-	-
12/13	-	10.0	0.0	0.0	-	-
		1985				
01/10	-	10.0	0.0	0.0	-	-
02/13	1022	10.0	0.4	0.4	30	44
03/03	1110	10.0	0.1	0.1	38	48
03/14	1010	3.0	0.0	0.0	92	102
03/26	1430	10.0	0.0	0.0	22	32
05/01	1308	8.0	0.0	0.0	38	42
05/28	1310	9.0	0.0	0.0	26	36
06/22	0848	6.0	0.0	0.0	34	40
07/25	0854	10.0	0.0	0.0	34	36
08/22	1042	10.0	0.9	0.9	12	15
09/19	1040	10.0	0.4	0.4	14	27
11/12	1633	10.0	1.0	1.0	22	36
12/05	1122	10.0	0.0	0.0	48	56
		1986				
01/07	1045	10.0	0.0	0.0	34	32

Table 24

Discrete Salinity and Suspended Sediment Samples

SG 13

Date	Time CST	Maximum Depth ft	Salinity ppt S	Salinity ppt M	Suspended Sediment mg/l S	Suspended Sediment mg/l M
		1983				
06/20	1446	12.0	0.4	-	-	-
07/07	-	12.0	0.2	0.2	-	-
07/21	-	12.0	0.3	0.3	-	-
08/04	-	12.0	0.5	0.8	-	-
09/01	1210	12.0	0.5	0.7	43	45
09/29	1331	12.0	11.9	12.1	16	22
11/03	-	12.0	17.6	-	-	-
12/14	-	12.0	2.6	2.7	-	-
		1984				
02/02	1253	12.0	0.3	0.4	188	210
02/29	1316	12.0	1.2	1.0	130	162
03/01	1325	16.0	0.9	1.0	142	184
03/14	1302	12.0	0.1	0.1	96	100
03/28	1310	16.0	0.1	0.1	134	134
04/26	1408	12.0	0.1	0.1	54	30
05/23	0624	12.0	0.4	0.5	86	86
06/20	1125	12.0	0.2	0.2	24	24
08/08	-	13.0	0.0	0.5	-	-
08/23	-	6.0	0.0	0.0	-	-
09/18	-	10.0	4.0	4.1	-	-
10/17	-	10.0	3.4	2.6	-	-
11/15	-	10.0	0.4	0.4	-	-
12/13	-	10.0	0.2	0.2	-	-
		1985				
01/10	-	12.0	0.0	0.0	-	-
02/13	0723	7.0	0.5	0.5	70	100
03/03	1123	12.0	0.5	0.5	62	76
03/14	0830	12.0	0.3	0.3	70	88
03/26	1445	12.0	0.4	0.4	104	110
05/01	1018	12.0	0.0	0.0	72	70
05/28	1035	6.0	0.0	0.0	18	40
06/23	1000	6.0	1.4	1.4	26	18
07/25	0619	12.0	1.1	1.1	36	22
08/22	0626	12.0	3.1	3.1	21	30
09/19	0630	12.0	13.3	13.3	48	42
11/12	1646	12.0	4.0	4.2	24	22
12/05	1138	12.0	0.0	0.0	132	152
		1986				
01/07	0742	10.0	0.0	0.0	62	68

Table 25

Discrete Salinity and Suspended Sediment Samples

SG 14

Date	Time CST	Salinity ppt Surface	Suspended Sediment mg/l Surface
		1983	
06/20	1505	0.3	-
07/07	-	0.2	-
07/21	-	0.3	-
08/04	-	0.8	-
08/31	-	1.3	41
09/29	-	13.8	27
11/03	-	16.6	-
12/01	-	1.1	-
12/14	-	0.7	-
		1984	
01/04	-	0.1	258
02/02	-	0.0	140
02/29	1355	0.3	200
03/14	1324	0.0	118
03/28	1335	0.3	160
04/26	1431	0.1	96
05/23	-	0.4	98
06/20	1137	0.2	30
08/09	-	0.0	-
08/23	-	0.0	-
09/18	-	4.5	-
10/17	-	4.7	-
11/15	-	1.1	-
12/13	-	0.7	-
		1985	
01/10	-	0.0	-
02/13	1110	0.7	146
03/03	0910	0.7	52
03/13	1900	0.0	116
03/26	1515	0.1	108
05/02	0810	0.0	84
05/28	1346	0.0	70
06/23	1102	1.3	80
07/24	1535	1.0	78
08/22	1315	3.1	81
09/18	1800	14.6	37
11/14	0805	0.0	100
12/03	1132	0.0	186
		1986	
01/07	1123	0.0	82